Access DB# 92001

SEARCH REQUEST FORM

Scientific and Technical Inf rmation Center

Requester's Full Name: Carol Chaney Examiner #: 72248 Date: 4-21-03
Art Unit: 1745 Phone Number 305 3777 Serial Number: 09/484799
Mail Box and Bldg/Room Location: CP3 8D03 Results Format Preferred (circle): PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

****

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: Lithium Based Phosphate Active Materials

Inventors (please provide full names): Jeremy Barker M. Yazid Saidi'

Earliest Priority Filing Date: 1-18-2000

***For Sequence Searches Only* Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.**

Compounds of the formula

$Li\ Fe_{1-y}M_yPO_4$ for $0<y<1$

M = Be, Mg, Ca, Sr, Ba

the compound has olivine structure

****

STAFF USE ONLY	Type of Search		Vendors and cost where applicable	
Searcher: EL	NA Sequence (#)		STN	$91.02
Searcher Phone #:	AA Sequence (#)		Dialog	
Searcher Location:	Structure (#)	✓ (1)	Questel/Orbit	
Date Searcher Picked Up:	Bibliographic	✓ (and)	DrugLink	
Date Completed: 4-22-03	Litigation		Lexis/Nexis	
Searcher Prep & Review Time: 5	Fulltext		Sequence Systems	
~~Clerical Prep Time:~~	Patent Family		WWW/Internet	
Online Time: 70	Other		Other (specify)	

PTO-1590 (8-01)

Simferite

Hide Locs

Formula: $Li(Mg,Fe,Mn)_2(PO_4)_2$

System: Orthorhombic **Colour:** Red

New IMA-approved mineral

Classification of Simferite	
IMA status:	Approved
Strunz ID:	7/A.02-05 7 : Phosphates, Arsenates, Vanadates A : Waterfree phosphates [PO4]3- without unfamiliar anions, cations of small size: Li, Be, Al 02 : Simferrite - Natrophilite series
mindat.org URL:	http://www.mindat.org/min-3665.html Please feel free to link to this page.
Type Occurrence of Simferite	
Type Locality:	Radionovskoye pegmatite, Middle Berda River, Zaporozh'e District, Azov Sea Region, Ukraine
Year of Discovery:	1989
Physical Properties of Simferite	
Colour:	Red
Crystallography of Simferite	
Crystal System:	Orthorhombic
Cell Parameters:	a = 4.74, b = 10.1, c = 5.89
Ratio:	a:b:c = 0.469 : 1 : 0.583
Optical Data of Simferite	
Type:	Biaxial
RI values	$n_{\α}$=1.690 - 1.704 $n_{\β}$=1.702 - 1.716 $n_{\γ}$=1.712 - 1.726 n=1.709 (average)
Maximum Birefriengence:	δ=0.022
Surface Relief:	High
Relationship of Simferite to other Species	

Olivine Mineral Data Pronunciation Guide

General Information

Chemical Formula: (Mg,Fe)2SiO4

Composition: Molecular Weight = 153.31 gm

Magnesium	25.37 %	Mg	42.06 %	MgO
Iron	14.57 %	Fe	18.75 %	FeO
Silicon	18.32 %	Si	39.19 %	SiO_2
Oxygen	41.74 %	O		
	100.00 %		100.00 %	= TOTAL OXIDE

Empirical Formula: $Mg_{1.6}Fe^{2+}_{0.4}(SiO_4)$

Environment: Basic and ultra basic igneous rocks.

IMA Status: Not IMA Approved

Locality: Common world wide occurrence. Link to MinDat.org Location Data.

Name Origin: Named after the green color.

Synonym: Chrysolite - light yellowish green
Peridot

Search for Olivine Images

Images:

Image Not Yet Available

Image **not yet** available on Webmineral.com
Try searching images.google.com for mineral pictures.
Caution: The images retrieved may not be appropriate.

Crystallography

Axial Ratios: a:b:c =0.4663:1:0.6146

Cell Dimensions: a = 4.78, b = 10.25, c = 6.3, Z = 4; V = 308.67 Den(Calc)= 3.30

Crystal System: **Orthorhombic - Dipyramidal** H-M Symbol (2/m 2/m 2/m) Space Group: Pbnm

Physical Properties

Cleavage: [001] Good, [010] Distinct

Density: 3.27 - 3.37, Average = 3.32
Diaphaniety: Transparent to translucent
Fracture: Brittle - Conchoidal - Very brittle fracture producing small, conchoidal fragments.
Habit: Massive - Granular - Common texture observed in granite and other igneous rock.
Hardness: 6.5-7 - Pyrite-Quartz
Luminescence: Non-fluorescent.
Luster: Vitreous (Glassy)
Streak: white

Optical Properties

Gladstone-Dale: CI meas= 0.01 (Superior) - where the CI = (1-KP_{Dmeas}/KC)
CI calc= 0.004 (Superior) - where the CI = (1-KP_{Dcalc}/KC)
KP_{Dcalc}= 0.2,KP_{Dmeas}= 0.1988,KC= 0.2009
Optical Data: Biaxial (+), a=1.63-1.65, b=1.65-1.67, g=1.67-1.69, bire=0.0400, 2V(Calc)=88, 2V(Meas)=46-98. Dispersion relatively weak.

Classification

Dana Class: **51.3.1.0** (51)Nesosilicate Insular SiO4 Groups Only
(51.3)with all cations in octahedral [6] coordination
(51.3.1)Olivine group

51.3.1.0 Olivine * (Mg,Fe)2SiO4 Pbnm 2/m 2/m 2/m
51.3.1.1 Fayalite Fe2SiO4 Pbnm 2/m 2/m 2/m
51.3.1.2 Forsterite Mg2SiO4 Pbnm 2/m 2/m 2/m
51.3.1.3 Liebenbergite (Ni,Mg)2SiO4 Pbnm 2/m 2/m 2/m
51.3.1.4 Tephroite Mn2SiO4 Pnma 2/m 2/m 2/m
51.3.1.5 Laihunite FeFe2(SiO4)2 P21/b 2/m

Strunz Class: **VIII/A.04-00** VIII - Silicates
VIII/A - Nesosilicates with [SiO4]4-groups, cations of octahedral orientation [6]
VIII/A.04 - Olivine group

Other Information

References: NAME(Duda&Rejl90) PHYS. PROP.(Dana) OPTIC PROP.(Dana)
See Also: **Links to other databases for Olivine :**
1 - AZ Minerals 2 - Am. Min. Crystal Structure DB 3 - Am. Min. Crystal Structure DB 4 - Am. Min. Crystal Structure DB 5 - Am. Min. Crystal Structure DB 6 - Am. Min. Crystal Structure DB 7 - Am. Min. Crystal Structure DB 8 - Am. Min. Crystal Structure DB 9 - Am. Min. Crystal Structure DB 10 - Am. Min. Crystal Structure DB 11 - Am. Min. Crystal Structure DB 12 - Am. Min. Crystal Structure DB 13 - Am. Min. Crystal Structure DB 14 - Applied Mineralogy 15 -Athena 16 - Crocoite.com Mineral Locations 17 - Glendale Community College 18 -Google Images 19 -MinDAT 20 -MinMax(Deutsch) 21 -MinMax(English) 22 - Mineral and Gemstone Kingdom 23 - Minerals in Thin Section-University of North Carolina 24 -Minerals in Thin

Sections-Humboldt State 25 - Philatelic Mineralogy 26 -The Mineral Gallery 27 - Thin Sections - Brock University 28 - Tradeshop.com - The Rainbow of Gems 29 - UCLA - Petrography Thin-Sections 30 -University of Colorado - Mineral Structure Data 31 - University of Manchester - Mineral Structure 32 -University of Minnesota 33 -University of Texas at Austin 34 - WWW-MINCRYST

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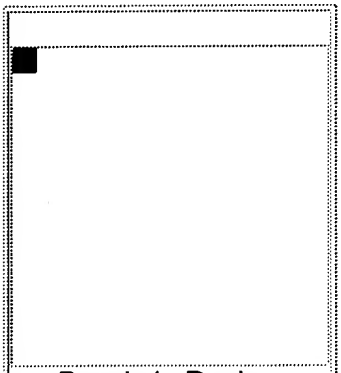
Olivine



Puy de la Donise, Puy-de-Dôme, Auvergne, France

Show Locs (188) | Olivine Gallery

Formula: $(Mg,Fe)_2SiO_4$

System: Orthorhombic **Colour:** Yellowish green, olive ...

Lustre: Vitreous **Hardness:** 6½ - 7

Name: Named after the green color.

Basic and ultra basic igneous rocks.

Classification of Olivine

Validity of Species:	Not a valid mineral species
Strunz ID:	8/AX.00-00 8 : Silicates AX : Unclassified nesosilicates 00 : Gadolinite Group
Hey's CIM Ref.:	14.21.1
mindat.org URL:	http://www.mindat.org/min-2983.html Please feel free to link to this page.

Physical Properties of Olivine

Lustre:	Vitreous
Colour:	Yellowish green, olive green, greenish black, or reddish brown
Streak:	White
Hardness (Mohs')	6½ - 7

Crystallography of Olivine

Crystal System:	Orthorhombic

Optical Data of Olivine

Type:	Biaxial (+)
RI values	$n_{\α}$=1.630 - 1.650 $n_{\β}$=1.650 - 1.670 $n_{\γ}$=1.670 - 1.690 n=1.660 (average)
2V	Measured: 46° to 98°, Calculated: 88°
Maximum Birefringence:	δ=0.040

Maximum Birefringence:	adeka, 0.040
Surface Relief:	Moderate

Chemical Properties of Olivine

Formula:	$(Mg,Fe)_2SiO_4$
Elements:	

Other Names for Olivine

Synonyms:	Chrysopal Glinkite Hawaiite Chrysolite (in part)
Varieties:	Calcio-Olivine Olivinoid

Internet Links for Olivine

Search Engines:	Look for Olivine on Google Look for Olivine images on Google
Mineral Databases:	Look for Olivine on Webmineral Look for Olivine on Athena Mineralogy
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Triphylite Mineral Data Pronunciation Guide

General Information

Chemical Formula: LiFe++PO4

Composition: Molecular Weight = 157.76 gm

Lithium	4.40 %	Li	9.47 %	Li_2O
Iron	35.40 %	Fe	45.54 %	FeO
Phosphorus	19.63 %	P	44.99 %	P_2O_5
Oxygen	40.57 %	O		
	100.00 %		100.00 %	= TOTAL OXIDE

Empirical Formula: $LiFe^{2+}(PO_4)$

Environment: Secondary mineral commonly pseudomorphic of the original species.

Locality: Branchville, Connecticut, USA. Link to MinDat.org Location Data.

Name Origin: From the Greek tri - "threefold" and fylon - "family" in allusion to the three cations in the formula.

Search for Triphylite Images

Images:

Image not yet Available

Image **not yet** available on Webmineral.com
Try searching images.google.com for mineral pictures.
Caution: The images retrieved may not be appropriate.

Crystallography

Axial Ratios: a:b:c =0.5819:1:0.454

Cell Dimensions: a = 6.0285, b = 10.3586, c = 4.7031, Z = 4; V = 293.69 Den(Calc)= 3.57

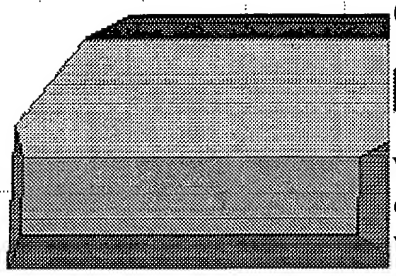
Crystal System: **Orthorhombic - Dipyramidal** H-M Symbol (2/m 2/m 2/m) Space Group: Pbnm

X Ray Diffraction: By Intensity(I/I_o): 2.54(1) 3.51(0.9) 4.29(0.9)

Forms:

Forms: **[0 1 0] [1 2 0] [0 2 1] [0 1 1] [1 0 0]**

Mouse
Dbl Clk - Start-Stop Rotation
RMB - Cycle Display Modes
Drag1 - Manipulate Crystal
Drag2 - Resize
Keyboard
S - Stereo
I - Indicies
<space> - Start-Stop Rotation
F - Fit to Screen
Help on Above



Large Pop-Up

Warning: this large pop-up is very compute intensive and may not work well with some computers.

Physical Properties

Cleavage: [001] Perfect, [110] Good
Density: 3.4 - 3.6, Average = 3.5
Diaphaniety: Transparent to translucent
Fracture: Uneven - Flat surfaces (not cleavage) fractured in an uneven pattern.
Habits: Prismatic - Crystals Shaped like Slender Prisms (e.g. tourmaline)., Massive - Granular - Common texture observed in granite and other igneous rock.
Hardness: 4-5 - Fluorite-Apatite
Luminescence: None.
Luster: Greasy (Oily)
Streak: grayish white

Optical Properties

Gladstone-Dale: CI meas= -0.006 (Superior) - where the CI = (1-KP_{Dmeas}/KC)
CI calc= 0.013 (Superior) - where the CI = (1-KP_{Dcalc}/KC)
KP_{Dcalc}= 0.1944,KP_{Dmeas}= 0.1983,KC= 0.197
Optical Data: Biaxial (+/-), a=1.689-1.694, b=1.689-1.695, g=1.695-1.702, bire=0.0060-0.0080

Classification

Dana Class: **38.1.1.1** (38)Anhydrous Phosphates, etc
(38.1)A+ B++ XO4
(38.1.1)Dana Group

38.1.1.1 Triphylite LiFePO4 Pbnm 2/m 2/m 2/m
38.1.1.2 Lithiophilite LiMnPO4 Pmnb 2/m 2/m 2/m
38.1.1.3 Natrophilite NaMnPO4 Pnam 2/m 2/m 2/m

Strunz Class: **VII/A.02-10** VII - Phosphates, Arsenates and Vanadates
VII/A - Waterfree phosphates [PO4]3- without unfamiliar anions. cations of medium size: Mostly Fe, Mn
VII/A.02 - Simferrite - Natrophilite series

VII/A.02-05 Simferite Li0.5(Mg0.5,Fe0.03,Mn0.2)2(PO4)3 Pbnm,Pbn21 Ortho
VII/A.02-10 Triphylite LiFePO4 Pbnm 2/m 2/m 2/m
VII/A.02-20 Lithiophilite LiMnPO4 Pmnb 2/m 2/m 2/m
VII/A.02-30 Ferrisicklerite Li(Fe,Mn)PO4 Pmnb 2/m 2/m 2/m
VII/A.02-40 Sicklerite Li(Mn,Fe)PO4 Pmnb 2/m 2/m 2/m
VII/A.02-50 Heterosite FePO4 Pmnb 2/m 2/m 2/m

VII/A.02-60 Purpurite MnPO4 Pmnb 2/m 2/m 2/m
VII/A.02-70 Maricite NaFePO4 Pmnb 2/m 2/m 2/m
VII/A.02-80 Natrophilite NaMnPO4 Pnam 2/m 2/m 2/m

Other Information

References: NAME(Duda&Rejl90) PHYS. PROP.(Enc. of Minerals,2nd ed.,1990) OPTIC PROP.(Enc. of Minerals,2nd ed.,1990)

See Also: **Links to other databases for Triphylite :**
1 - AZ Minerals 2 -Athena 3 - EUROmin Project 4 -Google Images 5 -MinDAT 6 -MinMax(Deutsch) 7 -MinMax(English) 8 - Minerals of Wisconsin 9 - Scandinavian mineral gallery 10 - WWW-MINCRYST 11 -École des Mines de Paris

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Triphylite

Show Locs (104)

Formula: $LiFePO_4$

System: Orthorhombic **Hardness:** 4 - 5

Classification of Triphylite	
IMA status:	Approved
Strunz ID:	7/A.02-10 7 : Phosphates, Arsenates, Vanadates A : Waterfree phosphates [PO4]3- without unfamiliar anions, cations of small size: Li, Be, Al 02 : Simferrite - Natrophilite series
Hey's CIM Ref.:	19.1.13
mindat.org URL:	http://www.mindat.org/min-4020.html Please feel free to link to this page.
Type Occurrence of Triphylite	
Type Locality:	Hühnerkobel Pegmatite, Rabenstein, Zwiesel, Bavarian Forest, Bavaria, Germany
Year of Discovery:	1834
Physical Properties of Triphylite	
Hardness (Mohs')	4 - 5
Crystallography of Triphylite	
Crystal System:	Orthorhombic
Cell Parameters:	a = 6.01, b = 11.34, c = 4.7
Ratio:	a:b:c = 0.53 : 1 : 0.414
Optical Data of Triphylite	
Type:	Biaxial (+/-)
RI values	$n_{\α}$=1.689 - 1.694 $n_{\β}$=1.689 - 1.695 $n_{\γ}$=1.695 - 1.702 n=1.692 (average)
Maximum Birefriengence:	δ=0.006 - 0.008
Surface Relief:	High
Relationship of Triphylite to other Species	
Series:	Forms a series with Lithiophilite (see here)

Related Minerals (Strunz Grouping):	7/A.02-05 Simferite	$Li(Mg,Fe,Mn)_2(PO_4)_2$
	7/A.02-20 Lithiophilite	$LiMnPO_4$
	7/A.02-30 Ferrisicklerite	$(Fe,LiMn)PO_4$
	7/A.02-40 Sicklerite	$Li(Mn,Fe)PO_4$
	7/A.02-50 Heterosite	$(Fe,Mn)PO_4$
	7/A.02-60 Purpurite	$(Mn,Fe)PO_4$
	7/A.02-70 Mari?ite	$NaFePO_4$
	7/A.02-80 Natrophilite	$NaMnPO_4$

Chemical Properties of Triphylite

Formula:	$LiFePO_4$
Elements:	
Common Impurities:	Mn,Mg,Ca

Other Names for Triphylite

Synonyms:	Lithio-Ferro-Triphylite

Internet Links for Triphylite

Search Engines:	Look for Triphylite on Google Look for Triphylite images on Google
Mineral Databases:	Look for Triphylite on Webmineral Look for Triphylite on Athena Mineralogy
Mineral Dealers:	e-mail for information on how to advertise here

Minerals: A B C D E F G H I J K L M N O P Q R S T U V W X Y Z or find: _____
Localities: A B C D E F G H I J K L M N O P Q R S T U V W X Y Z or find: _____
Photos: A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Natrophilite Mineral Data Pronunciation Guide

General Information

Chemical Formula: NaMnPO4

Composition: Molecular Weight = 172.90 gm

Sodium	13.30 %	Na	17.92 %	Na_2O	
Manganese	31.77 %	Mn	41.03 %	MnO	
Phosphorus	17.91 %	P	41.05 %	P_2O_5	
Oxygen	37.01 %	O			
	100.00 %		100.00 %	= TOTAL OXIDE	

Empirical Formula: $NaMn^{2+}(PO_4)$

Locality: Link to MinDat.org Location Data.

Search for Natrophilite Images

Images:

Image **not yet** available on Webmineral.com
Try searching images.google.com for mineral pictures.
Caution: The images retrieved may not be appropriate.

Crystallography

Axial Ratios: a:b:c =2.106:1:1.258

Cell Dimensions: a = 10.53, b = 5, c = 6.29, Z = 4; V = 331.17 Den(Calc)= 3.47

Crystal System: **Orthorhombic - Dipyramidal** H-M Symbol (2/m 2/m 2/m) Space Group: Pnam

X Ray Diffraction: By Intensity(I/I_o): 2.72(1) 2.6(0.8) 3.72(0.7)

Physical Properties

Cleavage: [100] Good, [010] Indistinct

Density: 3.41

Diaphaniety: Transparent to Translucent

Fracture: Conchoidal - Fractures developed in brittle materials characterized by smoothly curving surfaces, (e.g. quartz).
Habit: Massive - Uniformly indistinguishable crystals forming large masses.
Hardness: 4.5-5 - Near Apatite
Luminescence: Non-fluorescent.
Luster: Resinous
Magnetism: Nonmagnetic
Streak: white

Optical Properties

Gladstone-Dale: CI meas= -0.044 (Good) - where the CI = (1-KP_{Dmeas}/KC)
CI calc= -0.026 (Excellent) - where the CI = (1-KP_{Dcalc}/KC)
KP_{Dcalc}= 0.1949,KP_{Dmeas}= 0.1983,KC= 0.19

Optical Data: Biaxial (+), a=1.671, b=1.674, g=1.684, bire=0.0130, 2V(Calc)=58, 2V(Meas)=75. Dispersion relatively strong.

Classification

Dana Class: **38.1.1.3** (38)Anhydrous Phosphates, etc
(38.1)A+ B++ XO4
(38.1.1)Dana Group

38.1.1.1 Triphylite LiFePO4 Pbnm 2/m 2/m 2/m
38.1.1.2 Lithiophilite LiMnPO4 Pmnb 2/m 2/m 2/m
38.1.1.3 Natrophilite NaMnPO4 Pnam 2/m 2/m 2/m

Strunz Class: **VII/A.02-80** VII - Phosphates, Arsenates and Vanadates
VII/A - Waterfree phosphates [PO4]3- without unfamiliar anions. cations of medium size: Mostly Fe, Mn
VII/A.02 - Simferrite - Natrophilite series

VII/A.02-05 Simferite Li0.5(Mg0.5,Fe0.03,Mn0.2)2(PO4)3 Pbnm,Pbn21 Ortho
VII/A.02-10 Triphylite LiFePO4 Pbnm 2/m 2/m 2/m
VII/A.02-20 Lithiophilite LiMnPO4 Pmnb 2/m 2/m 2/m
VII/A.02-30 Ferrisicklerite Li(Fe,Mn)PO4 Pmnb 2/m 2/m 2/m
VII/A.02-40 Sicklerite Li(Mn,Fe)PO4 Pmnb 2/m 2/m 2/m
VII/A.02-50 Heterosite FePO4 Pmnb 2/m 2/m 2/m
VII/A.02-60 Purpurite MnPO4 Pmnb 2/m 2/m 2/m
VII/A.02-70 Maricite NaFePO4 Pmnb 2/m 2/m 2/m
VII/A.02-80 Natrophilite NaMnPO4 Pnam 2/m 2/m 2/m

Other Information

References: PHYS. PROP.(Enc. of Minerals,2nd ed.,1990) OPTIC PROP.(Enc. of Minerals,2nd ed.,1990)

See Also: **Links to other databases for Natrophilite :**
1 - Am. Min. Crystal Structure DB 2 -Athena 3 - EUROmin Project 4 -Google Images 5 -MinDAT 6 -MinMax(Deutsch) 7 -MinMax(English) 8 - WWW-MINCRYST 9 -École des Mines de Paris

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L4          1689 SEA BARKER J?/AU
L5           171 SEA SAIDI M?/AU OR SAIDI Y?/AU
L6            42 SEA L4 AND L5
L7         21717 SEA ?OLIVIN?
L8             3 SEA L6 AND L7
                 SEL L8 1-3 RN

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L9            68 SEA (257892-19-6/BI OR 349632-76-4/BI OR 349632-79-7/BI

L10           58 SEA L9 AND LI/ELS
L11            8 SEA L10 AND FE/ELS
L12            8 SEA L11 AND P/ELS
L13            8 SEA L12 AND O/ELS
L14            4 SEA L13 AND A2/PG

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L16        12258 SEA O4P
L17        91455 SEA LI/ELS
L18       688135 SEA FE/ELS
L19       288576 SEA A2/PG
L20           47 SEA L16 AND L17 AND L18 AND L19
L21           17 SEA L20 AND 5/ELC.SUB

     FILE 'HCAPLUS' ENTERED AT 13:30:22 ON 22 APR 2003
L22           18 SEA L21
L23            7 SEA L22 AND L7
L24            2 SEA L15 AND L7
L25           40 SEA L20
L26              QUE ELECTROD## OR ANOD## OR CATHOD##
L27       187327 SEA BATTERY OR BATTERIES OR (ELECTROCHEM? OR ELECTROLY?
                 OR GALVAN? OR WET OR DRY OR PRIMARY OR SECONDARY)(2A)(CEL
                 L OR CELLS)
L28           19 SEA L25 AND (L26 OR L27)
L29            9 SEA L25 AND L7
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L30 14 SEA L15 OR L23 OR L24 OR L29
L31 9 SEA (L22 OR L28) NOT L30

=> file hcaplus
FILE 'HCAPLUS' ENTERED AT 13:45:51 ON 22 APR 2003
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=> d l30 1-14 cbib abs hitstr hitind

L30 ANSWER 1 OF 14 HCAPLUS COPYRIGHT 2003 ACS
2003:97868 Document No. 138:140078 Alkali/transition metal halo- and hydroxy-phosphates and related electrode active materials. Barker, Jeremy; Saidi, M. Yazid; Swoyer, Jeffrey L. (UK). U.S. Pat. Appl. Publ. US 2003027049 A1 20030206, 22 pp., Cont.-in-part of U.S. 6,387,568. (English). CODEN: USXXCO. APPLICATION: US 2001-14822 20011026. PRIORITY: US 2000-559861 20000427.

AB An electroactive material comprises: AaMb(XY4)cZd, wherein (a) A is selected from the group consisting of Li, Na, and/or K, and a = 0-8; (b) M is .gtoreq.1 metal, comprising .gtoreq.1 metal which is capable of undergoing oxidn. to a higher valence state, and b = 1-3; (c) XY4 is selected from the group consisting of X'O4-xY'x, X'O4-yY'2y, X''S4, and mixts. thereof, where X' is P, As, Sb, Si, and/or Ge; X'' is P, As, Sb, Si, and/or Ge; Y' is halogen, x = 0-3; and y = 0-4; and c = 0-3; (d) Z is OH and/or halogen, d = 0-6; and wherein M, X, Y, Z, a, b, c, d, x, and y are selected so as to maintain the electroneutrality of the compd. Preferred embodiments include those having where c=1, those where c=2, and those where c=3. Preferred embodiments include those where a .ltoreq.1 and c=1, those where a=2 and c=1, and those where a.gtoreq.3 and c=3. This invention also provides electrodes comprising an electrode active material of this invention, and batteries that comprise a first electrode having an electrode active material of this invention; a second electrode having a compatible active material; and an electrolyte.

IT **484039-88-5P 484040-01-9P**, Iron lithium magnesium fluoride phosphate (Fe0.9Li1.25Mg0.1F0.25(PO4))
(alkali/transition metal halo- and hydroxy-phosphates and related electrode active materials)

RN 484039-88-5 HCAPLUS
CN Iron lithium magnesium fluoride phosphate (Fe0.9Li2Mg0.1F(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
F	1	14762-94-8
O4P	1	14265-44-2
Mg	0.1	7439-95-4

Li	2	7439-93-2
Fe	0.9	7439-89-6

RN 484040-01-9 HCAPLUS
CN Iron lithium magnesium fluoride phosphate (Fe0.9Li1.25Mg0.1F0.25(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
F	0.25	14762-94-8
O4P	1	14265-44-2
Mg	0.1	7439-95-4
Li	1.25	7439-93-2
Fe	0.9	7439-89-6

IC ICM H01M004-58
ICS C01B017-98; C01B025-10; C01B033-08
NCL 429231950; 429231900; 429221000; 429223000; 429224000; 429220000; 429231500; 429222000; 423332000; 423341000
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 49
IT Chalcogenides
Olivine-group minerals
Oxides (inorganic), uses
(alkali/transition metal halo- and hydroxy-phosphates and related electrode active materials)
IT 52934-02-8P, Cobalt lithium fluoride phosphate 52934-08-4P, Lithium nickel fluoride phosphate 257892-19-6P, Sodium vanadium fluoride phosphate (Na3V2F3(PO4)2) 477779-87-6P, Sodium vanadium fluoride phosphate NaVFPO4 477779-89-8P, Lithium sodium vanadiumfluoride phosphate (Li0.95Na0.05VF(PO4)) 484039-84-1P, Cobalt lithium fluoride phosphate (CoLi2F(PO4)) 484039-86-3P, Iron lithium fluoride phosphate (FeLi2F(PO4)) **484039-88-5P** 484039-91-0P, Lithium nickel fluoride phosphate (Li2NiF(PO4)) 484039-93-2P, Iron lithium fluoride phosphate 484039-95-4P, Lithium manganese fluoride phosphate (Li2MnF(PO4)) 484039-97-6P, Copper lithium fluoride phosphate (CuLi2F(PO4)) **484040-01-9P**, Iron lithium magnesium fluoride phosphate (Fe0.9Li1.25Mg0.1F0.25(PO4)) 484040-04-2P, Sodium vanadium fluoride phosphate (Na1.2VF1.2(PO4)) 484040-06-4P, Chromium sodium fluoride phosphate 484040-08-6P, Manganese sodium fluoride phosphate (MnNaF(PO4)) 484040-10-0P, Cobalt sodium fluoride phosphate (CoNaF(PO4)) 484040-12-2P, Lithium sodium vanadiumfluoride phosphate (Li0.1Na0.9VF(PO4)) 484040-13-3P, Sodium vanadium hydroxide phosphate NaVOHPO4 484040-14-4P, Iron lithium fluoride phosphate (Fe2Li4F(PO4)3)) 484040-15-5P, Lithium vanadium fluoride phosphate (Li4V2F(PO4)3)) 484040-20-2P, Lithium manganese fluoride phosphate (Li5Mn2F2(PO4)3) 484040-22-4P, Lithium vanadium fluoride phosphate (Li6V2F(PO4)3) 484040-25-7P, Chromium lithium sodium fluoride phosphate silicate (CrLiNa0.2F(PO4)0.8(SiO4)0.2) 484040-27-9P 484040-28-0P

493025-03-9P, Lithium manganese fluoride phosphate 493025-04-0P, Copper lithium fluoride phosphate
(alkali/transition metal halo- and hydroxy-phosphates and related electrode active materials)

L30 ANSWER 2 OF 14 HCAPLUS COPYRIGHT 2003 ACS
2003:42884 Document No. 138:92874 Alkali/transition metal halo- and hydroxy-phosphates and related electrode active materials. Barker, Jeremy; Saidi, M. Yazid; Swoyer, Jeffery L. (UK). U.S. Pat. Appl. Publ. US 2003013019 A1 20030116, 22 pp., Cont.-in-part of U. S. 6,387,568. (English). CODEN: USXXCO. APPLICATION: US 2001-45685 20011107. PRIORITY: US 2000-559861 20000427.

AB Electrode active materials comprise lithium or other alkali metals, a transition metal, a phosphate or similar moiety, and a halogen or hydroxyl moiety. Such electrode actives include those of the formula: AaMb(XY4)cZd wherein (a) A is selected from the group consisting of Li, Na, K, and mixts. thereof, and 0<a.ltoreq.6; (b) M comprises one or more metals, comprising at least one metal which is capable of undergoing oxidn. to a higher valence state, and 1.ltoreq.b.ltoreq.3; (c) XY4 is selected from the group consisting of X'O4-xY'Xx, X'O4-yY'2y , X''S4, and mixts. thereof, where X' is P, As, Sb, Si, Ge, S, and mixts. thereof; X'' is P, As, Sb, Si, Ge and mixts. thereof; Y' is halogen; 0.ltoreq.x<3; and 0<y<4; and 0<c.ltoreq.3; (d) Z is OH, halogen, or mixts. thereof, and 0<d.ltoreq.6; and wherein M, X, Y, Z, a, b, c, d, x and y are selected so as to maintain electroneutrality of the compd. In a preferred embodiment, M comprises two or more transition metals from Groups 4 to 11 of the Periodic Table. In another preferred embodiment, M comprises M'1-mM''m, where M' is at least one transition metal from Groups 4 to 11 of the Periodic Table; M'' is at least one element from Groups 2, 3, 12, 13, or 14 of the Periodic Table, and 0<m<1. Preferred embodiments include those having where c=1, those where c=2, and those where c=3. Preferred embodiments include those where a.ltoreq.1 and c=1, those where a=2 and c=1, and those where a.gtoreq.3 and c=3. This invention also provides electrodes comprising an electrode active material of this invention, and batteries that comprise a first electrode having an electrode active material of this invention; a second electrode having a compatible active material; and an electrolyte.

IT **484039-88-5**
(alkali/transition metal halo- and hydroxy-phosphates and related electrode active materials)

RN 484039-88-5 HCAPLUS
CN Iron lithium magnesium fluoride phosphate (Fe0.9Li2Mg0.1F(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
F	1	14762-94-8
O4P	1	14265-44-2
Mg	0.1	7439-95-4

Li	2	7439-93-2
Fe	0.9	7439-89-6

IT **484040-01-9P**
(alkali/transition metal halo- and hydroxy-phosphates and related electrode active materials)
RN 484040-01-9 HCAPLUS
CN Iron lithium magnesium fluoride phosphate (Fe0.9Li1.25Mg0.1F0.25(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
F	0.25	14762-94-8
O4P	1	14265-44-2
Mg	0.1	7439-95-4
Li	1.25	7439-93-2
Fe	0.9	7439-89-6

IC ICM H01M004-58
ICS C01B025-45; C01B025-30
NCL 429231900; 429231950; 429221000; 429223000; 429220000; 429224000; 429231500; 429231600; 423306000
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
IT 7440-44-0, Carbon, uses 7782-42-5, Graphite, uses 484039-84-1, Cobalt lithium fluoride phosphate (CoLi2F(PO4)) 484039-86-3, Iron lithium fluoride phosphate (FeLi2F(PO4)) **484039-88-5**
(alkali/transition metal halo- and hydroxy-phosphates and related electrode active materials)
IT 52934-02-8P, Cobalt lithium fluoride phosphate 477779-87-6P, Sodium vanadium fluoride phosphate NaVFPO4 484039-91-0P, Lithium nickel fluoride phosphate (Li2NiF(PO4)) 484039-93-2P, Iron lithium fluoride phosphate 484039-95-4P, Lithium manganese fluoride phosphate (Li2MnF(PO4)) 484039-97-6P, Copper lithium fluoride phosphate (CuLi2F(PO4)) **484040-01-9P** 484040-04-2P, Sodium vanadium fluoride phosphate (Na1.2VF1.2(PO4)) 484040-06-4P, Chromium sodium fluoride phosphate 484040-08-6P, Manganese sodium fluoride phosphate (MnNaF(PO4)) 484040-10-0P, Cobalt sodium fluoride phosphate (CoNaF(PO4)) 484040-12-2P 484040-13-3P, Sodium vanadium hydroxide phosphate (NaV(OH)(PO4)) 484040-14-4P, Iron lithium fluoride phosphate (Fe2Li4F(PO4)3) 484040-15-5P, Lithium vanadium fluoride phosphate (Li4V2F(PO4)3) 484040-20-2P, Lithium manganese fluoride phosphate (Li5Mn2F2(PO4)3) 484040-22-4P, Lithium vanadium fluoride phosphate (Li6V2F(PO4)3) 484040-25-7P 484040-27-9P 484040-28-0P
(alkali/transition metal halo- and hydroxy-phosphates and related electrode active materials)

L30 ANSWER 3 OF 14 HCAPLUS COPYRIGHT 2003 ACS
2002:928099 Document No. 138:6481 Process for producing carbon-containing lithium-iron composite phosphorus oxide for lithium secondary battery cathode active material. Kohzaki, Masao;

Takeuchi, Youji; Ukyo, Yoshio (Kabushiki Kaisha Toyota Chuo Kenkyusho, Japan). U.S. Pat. Appl. Publ. US 2002182497 A1 20021205, 11 pp. (English). CODEN: USXXCO. APPLICATION: US 2002-143946 20020514. PRIORITY: JP 2001-145396 20010515.

AB A carbon-contg. lithium-iron composite phosphorus oxide for a lithium secondary battery pos. electrode active material, includes particles being composed of a lithium-iron composite phosphorus oxide having an **olivine** structure whose basic compn. is LiFePO4, and being composited with carbonaceous fine particles. A process for producing the same includes the steps of mixing a lithium compd. making a lithium source, an iron compd. making an iron source, a phosphorus-contg. ammonium salt making a phosphorus source and carbonaceous fine particles, thereby prepg. a mixt., and calcicing the mixt. at a temp. of from 600.degree. or more to 750.degree. or less.

IT **476670-01-6P**, Iron lithium magnesium phosphate (Fe0.8-0.98LiMg0.02-0.2(PO4))
(carbon composited; process for producing carbon-contg. lithium-iron composite phosphorus oxide for lithium secondary battery cathode active material)

RN 476670-01-6 HCAPLUS

CN Iron lithium magnesium phosphate (Fe0.8-0.98LiMg0.02-0.2(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Mg	0.02 - 0.2	7439-95-4
Li	1	7439-93-2
Fe	0.8 - 0.98	7439-89-6

IC ICM H01M004-58

NCL 429221000; 429232000; 252182100

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 49

IT 15365-14-7P, Iron lithium phosphate FeLiPO4 476669-99-5P, Iron lithium manganese phosphate (Fe0.8-0.98LiMn0.02-0.2(PO4)) **476670-01-6P**, Iron lithium magnesium phosphate (Fe0.8-0.98LiMg0.02-0.2(PO4)) 476670-03-8P, Iron lithium nickel phosphate (Fe0.8-0.98LiNi0.02-0.2(PO4)) 476670-05-0P, Cobalt iron lithium phosphate (Co0.02-0.2Fe0.8-0.98Li(PO4)) 476670-07-2P, Copper iron lithium phosphate (Cu0.02-0.2Fe0.8-0.98Li(PO4)) 476670-10-7P, Iron lithium zinc phosphate (Fe0.8-0.98LiZn0.02-0.2(PO4)) 476670-12-9P, Germanium iron lithium phosphate (Ge0.02-0.2Fe0.8-0.98Li(PO4))
(carbon composited; process for producing carbon-contg. lithium-iron composite phosphorus oxide for lithium secondary battery cathode active material)

L30 ANSWER 4 OF 14 HCAPLUS COPYRIGHT 2003 ACS

2002:794447 Document No. 138:41938 Electronically conductive phospho-

olivines as lithium storage electrodes. Chung, Sung-Yoon; Bloking, Jason T.; Chiang, Yet-Ming (Department of Materials Science and Engineering, Massachusetts Institute of Technology, Cambridge, MA, 02139, USA). Nature Materials, 1(2), 123-128 (English) 2002. CODEN: NMAACR. ISSN: 1476-1122. Publisher: Nature Publishing Group.

AB Lithium transition metal phosphates are of interest as storage cathodes for rechargeable Li batteries because of their high energy d., low raw materials cost, environmental friendliness and safety. Their key limitation was extremely low electronic cond., believed to be intrinsic to this family of compds. Controlled cation nonstoichiometry combined with solid-soln. doping by metals supervalent to Li+ increases the electronic cond. of LiFePO4 by a factor of .apprx.108. The resulting materials show near-theor. energy d. at low charge/discharge rates, and retain significant capacity with little polarization at rates as high as 6,000 mA/g. In a conventional cell design, they may allow development of Li batteries with the highest power d. yet.

IT **478819-84-0**, Iron lithium magnesium phosphate (FeLi0.99Mg0.01(PO4)) **478819-92-0**, Iron lithium magnesium phosphate (Fe0.99LiMg0.01(PO4))
(electronically conductive phospho-**olivines** as lithium storage cathodes for batteries)

RN 478819-84-0 HCAPLUS

CN Iron lithium magnesium phosphate (FeLi0.99Mg0.01(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Mg	0.01	7439-95-4
Li	0.99	7439-93-2
Fe	1	7439-89-6

RN 478819-92-0 HCAPLUS

CN Iron lithium magnesium phosphate (Fe0.99LiMg0.01(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Mg	0.01	7439-95-4
Li	1	7439-93-2
Fe	0.99	7439-89-6

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST lithium battery storage cathode cond doped phospho **olivine** ; iron lithium phosphate doped aluminum magnesium niobium titanium zirconium

IT Battery cathodes

(electronically conductive phospho-**olivines** as lithium storage cathodes for batteries)

IT 15365-14-7, Iron lithium phosphate (FeLiPO4)
(doped; electronically conductive phospho-**olivines** as lithium storage cathodes for batteries)

IT 478819-81-7, Iron lithium zirconium phosphate (FeLi0.99Zr0.01(PO4))
478819-82-8, Iron lithium titanium phosphate (FeLi0.99Ti0.01(PO4))
478819-83-9, Iron lithium niobium phosphate (FeLi0.99Nb0.01(PO4))
478819-84-0, Iron lithium magnesium phosphate (FeLi0.99Mg0.01(PO4)) 478819-85-1, Aluminum iron lithium phosphate (Al0.01FeLi0.99(PO4)) 478819-86-2, Iron lithium niobium phosphate (Fe0.99LiNb0.01(PO4)) 478819-87-3, Iron lithium titanium phosphate (Fe0.99LiTi0.01(PO4)) 478819-89-5, Iron lithium zirconium phosphate (Fe0.99LiZr0.01(PO4)) 478819-90-8, Aluminum iron lithium phosphate (Al0.01Fe0.99Li(PO4)) **478819-92-0**, Iron lithium magnesium phosphate (Fe0.99LiMg0.01(PO4))
(electronically conductive phospho-**olivines** as lithium storage cathodes for batteries)

L30 ANSWER 5 OF 14 HCAPLUS COPYRIGHT 2003 ACS

2002:428819 Document No. 137:8642 Methods of making lithium metal compounds useful as cathode active materials in batteries. Barker, Jeremy; Yazid, Saidi M.; Swoyer, Jeffrey L. (Valence Technology, Inc., USA). PCT Int. Appl. WO 2002044084 A2 20020606, 85 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2001-US43633 20011119. PRIORITY: US 2000-724085 20001128.

AB The invention provides a novel method for making lithium mixed metal materials for battery cathodes. The lithium mixed metal materials comprise lithium and at least one other metal besides lithium. The invention involves the reaction of a metal compd., a phosphate compd., with a reducing agent to reduce the metal and form a metal phosphate. The invention also includes methods of making lithium metal oxides involving reaction of a lithium compd. and a metal oxide with a reducing agent.

IT **349632-76-4P**, Iron lithium magnesium phosphate (Fe0.9LiMg0.1(PO4))
(methods of making lithium metal compds. useful as cathode active materials in batteries)

RN 349632-76-4 HCAPLUS

CN Iron lithium magnesium phosphate (Fe0.9LiMg0.1(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number

O4P	1	14265-44-2
Mg	0.1	7439-95-4
Li	1	7439-93-2
Fe	0.9	7439-89-6

IC ICM C01B025-00
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 49
IT 7664-38-2DP, Phosphoric acid, lithiated transition metal compds. 12162-92-4P, Lithium vanadium oxide liv2o5 15365-14-7P, Iron lithium phosphate felipo4 84159-18-2P, Lithium vanadium phosphate Li3V2(PO4)3 **349632-76-4P**, Iron lithium magnesium phosphate (Fe0.9LiMg0.1(PO4)) 372075-82-6P, Lithium manganese fluoride phosphate LiMnFPO4 372075-83-7P, Lithium vanadium fluoride phosphate (LiVF(PO4)) 372075-84-8P, Chromium lithium fluoride phosphate CrLiFPO4 372075-85-9P, Lithium titanium fluoride phosphate LiTiFPO4 372075-86-0P 372075-87-1P, Iron lithium fluoride phosphate FeLiFPO4 433708-98-6P, Copper lithium fluoride phosphate (CuLiF(PO4)) 433708-99-7P, Cobalt lithium fluoride phosphate (CoLiF(PO4)) 433709-00-3P, Lithium nickel fluoride phosphate (LiNiF(PO4)) 433709-01-4P, Iron lithium magnesium phosphate (Fe0.67LiMg0.33(PO4))
(methods of making lithium metal compds. useful as cathode active materials in batteries)

L30 ANSWER 6 OF 14 HCAPLUS COPYRIGHT 2003 ACS
2002:272915 Document No. 136:297401 Nonaqueous electrolyte battery with high discharge capacity. Sakai, Hidecki; Fukushima, Yuzuru; Kuyama, Junji; Hosoya, Mamoru (Sony Corporation, Japan). Eur. Pat. Appl. EP 1195838 A2 20020410, 17 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN: EPXXDW. APPLICATION: EP 2001-123895 20011005. PRIORITY: JP 2000-308303 20001006.
AB A nonaq. electrolyte cell is disclosed having high discharge capacity, an improved capacity upkeep ratio and optimum cyclic characteristics. The nonaq. electrolyte cell has a cell device including a strip-shaped cathode material and a strip-shaped anode material, layered and together via a separator and coiled a plural no. of times, a nonaq. electrolyte soln., and a cell can for accommodating cell device and the nonaq. electrolyte soln. The cathode employs a cathode active material contg. a compd. of the **olivinic** structure represented by the general formula LixFe1-yMyPO4, where M is at least one selected from the group consisting of Mn, Cr, Co, Cu, Ni, V, Mo, Ti, Zn, Al, Ga, Mg, B and Nb, with 0.05 .ltoreq. x .ltoreq. 1.2 and 0 .ltoreq. y .ltoreq. 0.8, with the compd. being used either singly or in combination with other materials. The ratio of an inner diam. d to an outer diam. D of cell device is selected so that 0.05 < d/D < 0.5.
IT **407606-49-9**, Iron lithium magnesium phosphate (Fe0.2-1Li0.05-1.2Mg0-0.8(PO4))
(nonaq. electrolyte battery with high discharge capacity)

RN 407606-49-9 HCAPLUS
CN Iron lithium magnesium phosphate (Fe0.2-1Li0.05-1.2Mg0-0.8(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Mg	0 - 0.8	7439-95-4
Li	0.05 - 1.2	7439-93-2
Fe	0.2 - 1	7439-89-6

IC ICM H01M010-40
ICS H01M004-58
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
IT 7439-93-2, Lithium, uses 15365-14-7, Iron lithium phosphate felipo4 407606-22-8, Chromium iron lithium phosphate (Cr0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-24-0, Cobalt iron lithium phosphate (Co0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-26-2, Copper iron lithium phosphate (Cu0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-28-4, Aluminum iron lithium phosphate (Al0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-30-8, Gallium iron lithium phosphate (Ga0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-32-0, Boron iron lithium phosphate (B0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-34-2, Iron lithium manganese phosphate (Fe0.2-1Li0.05-1.2Mn0-0.8(PO4)) 407606-36-4, Iron lithium nickel phosphate (Fe0.2-1Li0.05-1.2Ni0-0.8(PO4)) 407606-39-7, Iron lithium vanadium phosphate (Fe0.2-1Li0.05-1.2V0-0.8(PO4)) 407606-42-2, Iron lithium molybdenum phosphate (Fe0.2-1Li0.05-1.2Mo0-0.8(PO4)) 407606-44-4, Iron lithium titanium phosphate (Fe0.2-1Li0.05-1.2Ti0-0.8(PO4)) 407606-47-7, Iron lithium zinc phosphate (Fe0.2-1Li0.05-1.2Zn0-0.8(PO4)) **407606-49-9**, Iron lithium magnesium phosphate (Fe0.2-1Li0.05-1.2Mg0-0.8(PO4)) 407606-51-3, Iron lithium niobium phosphate (Fe0.2-1Li0.05-1.2Nb0-0.8(PO4)) 407629-83-8 407629-87-2 407629-90-7 407629-95-2 407630-01-7 407630-05-1 407630-10-8 407630-14-2 407630-25-5, Aluminum iron lithium phosphate (Al0.7Fe0.3Li(PO4)) 407630-29-9, Gallium iron lithium phosphate (Ga0.7Fe0.3Li(PO4)) 407630-35-7 407630-40-4, Boron iron lithium phosphate (B0.75Fe0.25Li(PO4)) 408501-54-2
(nonaq. electrolyte battery with high discharge capacity)

L30 ANSWER 7 OF 14 HCAPLUS COPYRIGHT 2003 ACS
2002:272914 Document No. 136:297400 Nonaqueous electrolyte secondary battery using **olivinic** lithium phosphorus oxide cathode active material. Okawa, Tsuyoshi; Hosoya, Mamoru; Kuyama, Junji; Fukushima, Yuzuru (Sony Corporation, Japan). Eur. Pat. Appl. EP 1195837 A2 20020410, 15 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN: EPXXDW. APPLICATION: EP 2001-123893 20011005. PRIORITY: JP 2000-308302 20001006.
AB In a battery, liq. leakage or destruction may be prevented as the apparent energy d. per unit vol. of the cell is maintained. The

cell uses, as a cathode active material, a compd. of an **olivinic** crystal structure having the formula LixFe1-xMyPO4, where M is at least one selected from the group of Mn, Cr, Co, Cu, Ni, V, Mo, Ti, Zn, Al, Ga, Mg, B and Nb and 0.05 .ltoreq. x .ltoreq. 1.2 and 0 .ltoreq. y .ltoreq. 0.8. By adjusting the amt. of the electrolyte soln., the amt. of the void in the container is set so as to be not less than 0.14 mL and not more than 3.3 mL per 1 Ah of the cell capacity.

IT **407606-49-9**, Iron lithium magnesium phosphate (Fe0.2-1Li0.05-1.2Mg0-0.8(PO4))
(nonaq. electrolyte secondary battery using **olivinic** lithium phosphorus oxide cathode active material)

RN 407606-49-9 HCAPLUS

CN Iron lithium magnesium phosphate (Fe0.2-1Li0.05-1.2Mg0-0.8(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Mg	0 - 0.8	7439-95-4
Li	0.05 - 1.2	7439-93-2
Fe	0.2 - 1	7439-89-6

IC ICM H01M010-40
ICS H01M004-58

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST battery **olivinic** lithium phosphorus oxide cathode; nonaq electrolyte lithium secondary battery

IT Secondary batteries
(lithium; nonaq. electrolyte secondary battery using **olivinic** lithium phosphorus oxide cathode active material)

IT Battery cathodes
Composites
(nonaq. electrolyte secondary battery using **olivinic** lithium phosphorus oxide cathode active material)

IT Coke
(pitch; nonaq. electrolyte secondary battery using **olivinic** lithium phosphorus oxide cathode active material)

IT 108-32-7, Propylene carbonate 616-38-6, Dimethyl carbonate 7440-44-0, Carbon, uses 15365-14-7, Iron lithium phosphate felipo4 21324-40-3, Lithium hexafluorophosphate 407606-22-8, Chromium iron lithium phosphate (Cr0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-24-0, Cobalt iron lithium phosphate (Co0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-26-2, Copper iron lithium phosphate (Cu0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-28-4, Aluminum iron lithium phosphate (Al0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-30-8, Gallium iron lithium phosphate (Ga0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-32-0, Boron iron lithium phosphate (B0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-34-2, Iron lithium manganese phosphate (Fe0.2-1Li0.05-1.2Mn0-0.8(PO4))

407606-36-4, Iron lithium nickel phosphate (Fe0.2-1Li0.05-1.2Ni0-0.8(PO4)) 407606-39-7, Iron lithium vanadium phosphate (Fe0.2-1Li0.05-1.2V0-0.8(PO4)) 407606-42-2, Iron lithium molybdenum phosphate (Fe0.2-1Li0.05-1.2Mo0-0.8(PO4)) 407606-44-4, Iron lithium titanium phosphate (Fe0.2-1Li0.05-1.2Ti0-0.8(PO4)) 407606-47-7, Iron lithium zinc phosphate (Fe0.2-1Li0.05-1.2Zn0-0.8(PO4)) **407606-49-9**, Iron lithium magnesium phosphate (Fe0.2-1Li0.05-1.2Mg0-0.8(PO4)) 407606-51-3, Iron lithium niobium phosphate (Fe0.2-1Li0.05-1.2Nb0-0.8(PO4)) 407629-83-8 407629-87-2 407629-90-7 407629-95-2 407630-01-7 407630-05-1 407630-10-8 407630-14-2 407630-19-7 407630-25-5, Aluminum iron lithium phosphate (Al0.7Fe0.3Li(PO4)) 407630-29-9, Gallium iron lithium phosphate (Ga0.7Fe0.3Li(PO4)) 407630-35-7 407630-40-4, Boron iron lithium phosphate (B0.75Fe0.25Li(PO4)) 407630-46-0
(nonaq. electrolyte secondary battery using **olivinic** lithium phosphorus oxide cathode active material)

L30 ANSWER 8 OF 14 HCAPLUS COPYRIGHT 2003 ACS
2002:272913 Document No. 136:297399 Nonaqueous electrolyte secondary battery with a compound of an **olivinic** structure as a cathode active material. Okawa, Tsuyoshi; Hosoya, Mamoru; Kuyama, Junji; Fukushima, Yuzuru (Sony Corporation, Japan). Eur. Pat. Appl. EP 1195836 A2 20020410, 15 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN: EPXXDW. APPLICATION: EP 2001-123892 20011005. PRIORITY: JP 2000-308301 20001006.

AB A non-aq. electrolyte secondary cell contg. a compd. of an **olivinic** structure as a cathode active material is to be improved in load characteristics and cell capacity. To this end, there is provided a non-aq. electrolyte secondary cell including a cathode having a layer of a cathode active material contg. a compd. represented by the general formula LixFe1-yMyPO4, where M is at least one selected from the group consisting of Mn, Cr, Co, Cu, Ni, V, Mo, Ti, Zn, Al, Ga, Mg, B and Nb, with 0.05 .ltoreq. x .ltoreq. 1.2 and 0 .ltoreq. y .ltoreq. 0.8, an anode having a layer of an anode active material and a non-aq. electrolyte, wherein the layer of the cathode active material has a film thickness in a range from 25 to 110 .mu.m. If a layer of a cathode active material is provided on each surface of a cathode current collector, the sum of the film thicknesses of the layers of the cathode active material ranges between 50 and 220 .mu.m. The non-aq. electrolyte may be a liq.-based electrolyte or a polymer electrolyte.

IT **407606-49-9**, Iron lithium magnesium phosphate (Fe0.2-1Li0.05-1.2Mg0-0.8(PO4))
(nonaq. electrolyte secondary battery with compd. of **olivinic** structure as cathode active material)

RN 407606-49-9 HCAPLUS
CN Iron lithium magnesium phosphate (Fe0.2-1Li0.05-1.2Mg0-0.8(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number

O4P	1	14265-44-2
Mg	0 - 0.8	7439-95-4
Li	0.05 - 1.2	7439-93-2
Fe	0.2 - 1	7439-89-6

IC ICM H01M010-40
ICS H01M004-58
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST battery secondary **olivinic** structure cathode active material
IT Ball milling
Battery cathodes
Secondary batteries
(nonaq. electrolyte secondary battery with compd. of **olivinic** structure as cathode active material)
IT Carbon black, uses
(nonaq. electrolyte secondary battery with compd. of **olivinic** structure as cathode active material)
IT 10377-52-3, Lithium phosphate 13977-75-8, Phosphoric acid, iron(3+) salt (3:2)
(nonaq. electrolyte secondary battery with compd. of **olivinic** structure as cathode active material)
IT 108-32-7, Propylene carbonate 616-38-6, Dimethyl carbonate 7440-44-0, Carbon, uses 7782-42-5, Graphite, uses 15365-14-7, Iron lithium phosphate felipo4 21324-40-3, Lithium hexafluorophosphate 407606-22-8, Chromium iron lithium phosphate (Cr0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-24-0, Cobalt iron lithium phosphate (Co0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-26-2, Copper iron lithium phosphate (Cu0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-28-4, Aluminum iron lithium phosphate (Al0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-30-8, Gallium iron lithium phosphate (Ga0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-32-0, Boron iron lithium phosphate (B0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-36-4, Iron lithium nickel phosphate (Fe0.2-1Li0.05-1.2Ni0-0.8(PO4)) 407606-39-7, Iron lithium vanadium phosphate (Fe0.2-1Li0.05-1.2V0-0.8(PO4)) 407606-42-2, Iron lithium molybdenum phosphate (Fe0.2-1Li0.05-1.2Mo0-0.8(PO4)) 407606-44-4, Iron lithium titanium phosphate (Fe0.2-1Li0.05-1.2Ti0-0.8(PO4)) 407606-47-7, Iron lithium zinc phosphate (Fe0.2-1Li0.05-1.2Zn0-0.8(PO4)) **407606-49-9**, Iron lithium magnesium phosphate (Fe0.2-1Li0.05-1.2Mg0-0.8(PO4)) 407606-51-3, Iron lithium niobium phosphate (Fe0.2-1Li0.05-1.2Nb0-0.8(PO4)) 407629-83-8 407629-87-2 407629-90-7 407629-95-2 407630-01-7 407630-05-1 407630-10-8 407630-14-2 407630-19-7 407630-25-5, Aluminum iron lithium phosphate (Al0.7Fe0.3Li(PO4)) 407630-29-9, Gallium iron lithium phosphate (Ga0.7Fe0.3Li(PO4)) 407630-35-7 407630-40-4, Boron iron lithium phosphate (B0.75Fe0.25Li(PO4)) 407630-46-0
(nonaq. electrolyte secondary battery with compd. of **olivinic** structure as cathode active material)
IT 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer
(nonaq. electrolyte secondary battery with compd. of

olivinic structure as cathode active material)

IT 7439-93-2, Lithium, uses
(nonaq. electrolyte secondary battery with compd. of **olivinic** structure as cathode active material)

L30 ANSWER 9 OF 14 HCAPLUS COPYRIGHT 2003 ACS

2002:256757 Document No. 136:282003 Lithium-based cathode active materials for rechargeable lithium battery and preparation thereof. Barker, Jeremy; Saidi, M. Yazid; Swoyer, Jeffrey L. (UK). U.S. Pat. Appl. Publ. US 2002039687 A1 20020404, 39 pp., Cont.-in-part of U. S. Ser. No. 484,799. (English). CODEN: USXXCO. APPLICATION: US 2001-908480 20010718. PRIORITY: US 2000-484799 20000118; WO 2000-US35302 20001222.

AB The invention provides novel lithium-mixed metal materials which, upon electrochem. interaction, release lithium ions, and are capable of reversibly cycling lithium ions. The invention provides a rechargeable lithium battery which comprises an electrode formed from the novel lithium-mixed metal materials. Methods for making the novel lithium-mixed metal materials and methods for using such lithium-mixed metal materials in electrochem. cells are also provided. The lithium-mixed metal materials comprise lithium and at least one other metal besides lithium. Preferred materials are lithium-mixed metal phosphates which contain lithium and two other metals besides lithium.

IT **349632-76-4P**, Iron lithium magnesium phosphate (Fe0.9LiMg0.1(PO4)) **349632-79-7P**, Calcium iron lithium phosphate (Ca0.1Fe0.9Li(PO4))
(lithium-based cathode active materials for rechargeable lithium battery and prepn. thereof)

RN 349632-76-4 HCAPLUS

CN Iron lithium magnesium phosphate (Fe0.9LiMg0.1(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Mg	0.1	7439-95-4
Li	1	7439-93-2
Fe	0.9	7439-89-6

RN 349632-79-7 HCAPLUS

CN Calcium iron lithium phosphate (Ca0.1Fe0.9Li(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Ca	0.1	7440-70-2
Li	1	7439-93-2
Fe	0.9	7439-89-6

IC ICM H01M004-58
ICS C01B025-45
NCL 429231950
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
IT **Olivine**-group minerals
(lithium-based cathode active materials for rechargeable lithium battery and prepn. thereof)
IT 84159-18-2P, Lithium vanadium phosphate Li3V2(PO4)3
349632-76-4P, Iron lithium magnesium phosphate (Fe0.9LiMg0.1(PO4)) **349632-79-7P**, Calcium iron lithium phosphate (Ca0.1Fe0.9Li(PO4)) 349632-82-2P, Iron lithium zinc phosphate (Fe0.9LiZn0.1(PO4))
(lithium-based cathode active materials for rechargeable lithium battery and prepn. thereof)

L30 ANSWER 10 OF 14 HCAPLUS COPYRIGHT 2003 ACS
2001:796594 Document No. 135:333335 Cathode active mass and batteries thereof. Katayama, Sadahiro; Inamasu, Norio (Yuasa Corporation, Japan). Jpn. Kokai Tokkyo Koho JP 2001307726 A2 20011102, 5 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2000-122550 20000424.
AB The cathode active mass is LiFe1-xMxPO4, where M = Mg, Ca, Sr, Ba, Sc, Y, Zn, Al, Ga, In, Si, and/or rare earth element and 0 <x <0.5. Batteries using the active mass are secondary Li batteries.
IT **349632-79-7**, Calcium iron lithium phosphate (Ca0.1Fe0.9LiPO4)
(compns. of substituted iron lithium phosphates for cathodes in secondary lithium batteries)
RN 349632-79-7 HCAPLUS
CN Calcium iron lithium phosphate (Ca0.1Fe0.9Li(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Ca	0.1	7440-70-2
Li	1	7439-93-2
Fe	0.9	7439-89-6

IC ICM H01M004-58
ICS H01M004-02; H01M010-40
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
IT **349632-79-7**, Calcium iron lithium phosphate (Ca0.1Fe0.9LiPO4) 369596-75-8, Iron lithium strontium phosphate (Fe0.9LiSr0.1(PO4)) 369596-76-9
(compns. of substituted iron lithium phosphates for cathodes in secondary lithium batteries)

L30 ANSWER 11 OF 14 HCAPLUS COPYRIGHT 2003 ACS
2001:546025 Document No. 135:109741 Preparation of lithium-based electrochemically active materials for lithium batteries. Barker,

Jeremy; Saidi, M. Yazid (Valence Technology, Inc., USA). PCT Int. Appl. WO 2001054212 A1 20010726, 97 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2000-US35302 20001222. PRIORITY: US 2000-484799 20000118.

AB The invention provides novel lithium-mixed metal materials which, upon electrochem. interaction, release lithium ions, and are capable of reversibly cycling lithium ions. The invention provides a rechargeable lithium battery which comprises an electrode formed from the novel lithium-mixed metal materials. Methods for making the novel lithium-mixed metal materials and methods for using such lithium-mixed metal materials in electrochem. cells are also provided. The lithium-mixed metal materials comprise lithium and at least one other metal besides lithium. Preferred materials are lithium-mixed metal phosphates which contain lithium and two other metals besides lithium.

IT **349632-76-4P**, Iron lithium magnesium phosphate (Fe0.9LiMg0.1(PO4)) **349632-79-7P**, Calcium iron lithium phosphate (Ca0.1Fe0.9Li(PO4))
(prepn. of lithium-based electrochem. active materials for lithium batteries)

RN 349632-76-4 HCAPLUS

CN Iron lithium magnesium phosphate (Fe0.9LiMg0.1(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Mg	0.1	7439-95-4
Li	1	7439-93-2
Fe	0.9	7439-89-6

RN 349632-79-7 HCAPLUS

CN Calcium iron lithium phosphate (Ca0.1Fe0.9Li(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Ca	0.1	7440-70-2
Li	1	7439-93-2
Fe	0.9	7439-89-6

IC ICM H01M004-48

ICS H01M010-40
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 49
IT 331622-65-2P, Iron lithium zinc phosphate (Fe0.8LiZn0.2(PO4))
349632-76-4P, Iron lithium magnesium phosphate
(Fe0.9LiMg0.1(PO4)) **349632-79-7P**, Calcium iron lithium
phosphate (Ca0.1Fe0.9Li(PO4)) 349632-82-2P, Iron lithium zinc
phosphate (Fe0.9LiZn0.1(PO4)) 349632-85-5P 349632-88-8P
(prepn. of lithium-based electrochem. active materials for
lithium batteries)

L30 ANSWER 12 OF 14 HCAPLUS COPYRIGHT 2003 ACS
2001:545615 Document No. 135:109740 Preparation of lithium-containing materials for battery cathodes. Barker, Jeremy; Saidi, M. Yazid; Swoyer, Jeffrey L. (Valence Technology, Inc., USA). PCT Int. Appl. WO 2001053198 A1 20010726, 94 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2000-US35438 20001222. PRIORITY: US 2000-484919 20000118.
AB The invention provides novel lithium-mixed metal materials which, upon electrochem. interaction, release lithium ions, and are capable of reversibly cycling lithium ions. The invention provides a rechargeable lithium battery which comprises an electrode formed from the novel lithium-mixed metal materials. Methods for making the novel lithium-mixed metal materials and methods for using such lithium-mixed metal materials in electrochem. cells are also provided. The lithium-mixed metal materials comprise lithium and at least one other metal besides lithium. Preferred materials are lithium-mixed metal phosphates which contain lithium and two other metals besides lithium.
IT **349632-76-4P**, Iron lithium magnesium phosphate
(Fe0.9LiMg0.1(PO4)) **349632-79-7P**, Calcium iron lithium
phosphate (Ca0.1Fe0.9Li(PO4))
(prepn. of lithium-contg. materials for battery cathodes)
RN 349632-76-4 HCAPLUS
CN Iron lithium magnesium phosphate (Fe0.9LiMg0.1(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Mg	0.1	7439-95-4
Li	1	7439-93-2
Fe	0.9	7439-89-6

RN 349632-79-7 HCAPLUS
CN Calcium iron lithium phosphate (Ca0.1Fe0.9Li(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Ca	0.1	7440-70-2
Li	1	7439-93-2
Fe	0.9	7439-89-6

IC ICM C01B025-37
ICS C01B025-45; H01M004-58
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 49
IT 12162-92-4P, lithium vanadium oxide liv2o5 204653-30-5P, Lithium vanadium phosphate Li3V2(PO4)3 **349632-76-4P**, Iron lithium magnesium phosphate (Fe0.9LiMg0.1(PO4)) **349632-79-7P**, Calcium iron lithium phosphate (Ca0.1Fe0.9Li(PO4)) 349632-82-2P, Iron lithium zinc phosphate (Fe0.9LiZn0.1(PO4))
(prepn. of lithium-contg. materials for battery cathodes)

L30 ANSWER 13 OF 14 HCAPLUS COPYRIGHT 2003 ACS
2001:225610 Document No. 134:254632 Secondary lithium batteries using lithium iron phosphate cathodes. Takahashi, Masaya; Tobishima, Shinichi; Takei, Koji; Sakurai, Yoji (Nippon Telegraph and Telephone Corp., Japan). Jpn. Kokai Tokkyo Koho JP 2001085010 A2 20010330, 8 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1999-261394 19990916.
AB The batteries use LizFe1-yXyPO4 (0 < z .ltoreq. 1; X = element electrochem. stable in 3-4 V potential vs. Li std. potential) having **olivine**-type structure as the cathode active materials. Preferably, the X is Mg, Co, Ni, and/or Zn. The batteries, capable of charging and discharging at .ltoreq.4 V, inhibit decompn. of electrolyte, and show improved discharge capacity and cycling performance.
IT **331622-66-3P**, Iron lithium magnesium phosphate (Fe0.85LiMg0.15(PO4))
(cathodes; secondary Li batteries using lithium iron phosphate cathodes)
RN 331622-66-3 HCAPLUS
CN Iron lithium magnesium phosphate (Fe0.85LiMg0.15(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Mg	0.15	7439-95-4
Li	1	7439-93-2
Fe	0.85	7439-89-6

IC ICM H01M004-58
ICS H01M010-40
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
IT 331622-62-9P, Iron lithium nickel phosphate (Fe0.8LiNi0.2(PO4))
331622-63-0P, Cobalt iron lithium phosphate (Co0.2Fe0.8Li(PO4))
331622-64-1P, Cobalt iron lithium phosphate (Co0.1Fe0.9Li(PO4))
331622-65-2P, Iron lithium zinc phosphate (Fe0.8LiZn0.2(PO4))
331622-66-3P, Iron lithium magnesium phosphate (Fe0.85LiMg0.15(PO4))
(cathodes; secondary Li batteries using lithium iron phosphate cathodes)

L30 ANSWER 14 OF 14 HCAPLUS COPYRIGHT 2003 ACS
1991:683719 Document No. 115:283719 Crystal structure of simferite Li(Mg,Fe3+,Mn3+)2[PO4]2 [simferopolite]. Yakubovich, O. V.; Bairakov, V. V.; Simonov, M. A. (Mosk. Gos. Univ., Moscow, USSR). Doklady Akademii Nauk SSSR, 307(5), 1119-22 [Crystallogr.] (Russian) 1989. CODEN: DANKAS. ISSN: 0002-3264.
AB Dark-red grains of simferite (Sf) occur at the contact of rare-metal pegmatite with phlogopitized pegmatite; the commonly twinned crystals have their chem. compn. varying with optical properties (ns .alpha. 1.690-1.704, .beta. 1.702-1.716, .gamma. 1.712-1.726). With a possible space group of either D162h = Pbnm or C92v = Pbn21, the unit-cell parameters of Sf are: a 4.7468(7), b 10.101(2), and c 5.8992(7).ANG., Z = 4; the calcd. d. is 3.25 g/cm3. The Li+ cations in the crystal structure of Sf are located in octahedrons with a .hivin.1 symmetry. Measurements of cation-anion bond lengths in the M octahedrons show that these are similar to octahedrons in the structure of ferrosicklerite; coordinates of basis atoms, isotropic and anisotropic temp. factors, and interat. distances (in the Li- and M octahedrons and P tetrahedrons) are tabulated. Columns of **olivine**-type bands in the crystal structure of Sf are formed bound along the edges of Li-octahedrons; in contrast to minerals of the isomorphous series triphylite-lithiophylite, octahedrons in the columns of **olivine** bands are statistically only half-filled with Li atoms. The occupancy and geometry of the polyhedrons in the Sf structure are related, both structurally and chem., to members of the series triphylite-lithiophylite and ferrisicklerite-sicklerite. Based on the chem. analyses, the Li:P ratio in Sf is 1:2; a structural formula of Li0.5(Mg0.5Mn3+0.2Fe3+0.3)[PO4] is suggested for Sf.
IT **134914-37-7**, Simferite ([(Fe0.5-1Mn0-0.5)Mg]Li(PO4)2)
(crystal structure of)
RN 134914-37-7 HCAPLUS
CN Simferite ([(Fe0.5-1Mn0-0.5)Mg]Li(PO4)2) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	2	14265-44-2
Mn	0 - 0.5	7439-96-5

Mg	1	7439-95-4
Li	1	7439-93-2
Fe	0.5 - 1	7439-89-6

CC 53-1 (Mineralogical and Geological Chemistry)
Section cross-reference(s): 75
IT **134914-37-7**, Simferite ([(Fe0.5-1Mn0-0.5)Mg]Li(PO4)2)
(crystal structure of)

=> d l31 1-9 cbib abs hitstr hitind

L31 ANSWER 1 OF 9 HCAPLUS COPYRIGHT 2003 ACS
2002:272912 Document No. 136:297398 **Cathode** and **anode** materials for solid nonaqueous electrolyte **battery**. Takahashi, Kimio; Hosoya, Mamoru; Miyake, Masami (Sony Corporation, Japan). Eur. Pat. Appl. EP 1195835 A2 20020410, 22 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN: EPXXDW. APPLICATION: EP 2001-123773 20011004. PRIORITY: JP 2000-306877 20001005.

AB A **battery** is not deteriorated in cell characteristics and maintains the cell shape encapsulated in a laminate film even when overdischarged to a cell voltage of 0 V. The cell includes a **cathode** contg. a compd. having the formula LixFe1-yMyPO4, where M is at least one selected from the group consisting of Mn, Cr, Co, Cu, Ni, V, Mo, Ti, Zn, Al, Ga, Mg, B and Nb, with 0.05 .ltoreq. x .ltoreq. 1.2 and 0 .ltoreq. y .ltoreq. 0.8, an **anode** and a solid electrolyte. A cell member comprised of the **cathode** and the **anode**, layered together with the interposition of a solid electrolyte, is encapsulated in a laminate film.

IT **407606-49-9**, Iron lithium magnesium phosphate (Fe0.2-1Li0.05-1.2Mg0-0.8(PO4))
(**cathode** and **anode** materials for solid nonaq. electrolyte **battery**)
RN 407606-49-9 HCAPLUS
CN Iron lithium magnesium phosphate (Fe0.2-1Li0.05-1.2Mg0-0.8(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Mg	0 - 0.8	7439-95-4
Li	0.05 - 1.2	7439-93-2
Fe	0.2 - 1	7439-89-6

IC ICM H01M010-40
ICS H01M004-58
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST **battery** solid nonaq electrolyte **cathode**

anode material
IT **Battery anodes**
Battery cathodes
Battery electrolytes
(**cathode** and **anode** materials for solid nonaq. electrolyte **battery**)
IT 7440-44-0, Carbon, uses 15365-14-7, Iron lithium phosphate felipo4 407606-22-8, Chromium iron lithium phosphate (Cr0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-24-0, Cobalt iron lithium phosphate (Co0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-26-2, Copper iron lithium phosphate (Cu0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-28-4, Aluminum iron lithium phosphate (Al0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-30-8, Gallium iron lithium phosphate (Ga0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-32-0, Boron iron lithium phosphate (B0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-34-2, Iron lithium manganese phosphate (Fe0.2-1Li0.05-1.2Mn0-0.8(PO4)) 407606-36-4, Iron lithium nickel phosphate (Fe0.2-1Li0.05-1.2Ni0-0.8(PO4)) 407606-39-7, Iron lithium vanadium phosphate (Fe0.2-1Li0.05-1.2V0-0.8(PO4)) 407606-42-2, Iron lithium molybdenum phosphate (Fe0.2-1Li0.05-1.2Mo0-0.8(PO4)) 407606-44-4, Iron lithium titanium phosphate (Fe0.2-1Li0.05-1.2Ti0-0.8(PO4)) 407606-47-7, Iron lithium zinc phosphate (Fe0.2-1Li0.05-1.2Zn0-0.8(PO4)) **407606-49-9**, Iron lithium magnesium phosphate (Fe0.2-1Li0.05-1.2Mg0-0.8(PO4)) 407606-51-3, Iron lithium niobium phosphate (Fe0.2-1Li0.05-1.2Nb0-0.8(PO4))
(**cathode** and **anode** materials for solid nonaq. electrolyte **battery**)
IT 7439-93-2, Lithium, uses
(**cathode** and **anode** materials for solid nonaq. electrolyte **battery**)

L31 ANSWER 2 OF 9 HCAPLUS COPYRIGHT 2003 ACS
2002:272909 Document No. 136:297395 Method for fabrication of **cathode** active material and a nonaqueous electrolyte **battery**. Hosoya, Mamoru; Fukushima, Yuzuru; Sakai, Hidecki; Kuyama, Junji (Sony Corporation, Japan). Eur. Pat. Appl. EP 1195827 A2 20020410, 31 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN: EPXXDW. APPLICATION: EP 2001-123894 20011005. PRIORITY: JP 2000-308300 20001006; JP 2000-308313 20001006.
AB The invention comprises a method for producing a **cathode** active material having superior cell characteristics through single-phase synthesis of a composite material composed of a compd. represented by the general formula LixFe1-yMyPO4 and a carbon material pos. and a method for producing a non-aq. **electrolyte cell** employing the so produced **cathode** active material. To this end, the **cathode** active material is prepd. by a step of mixing the starting materials for synthesis of the compd. represented by the general formula LixFe1-yMyPO4, a step of milling a mixt. obtained by the mixing step, a step of compressing the mixt. obtained by the mixing step to a preset d. and a step of sintering the mixt. obtained by the

compressing step. A carbon material is added in any one of the above steps prior to the sintering step. The d. of the mixt. in the compressing step is set to not less than 1.71 g/cm3 and not larger than 2.45 g/cm3.

IT **407606-49-9**, Iron lithium magnesium phosphate (Fe0.2-1Li0.05-1.2Mg0-0.8(PO4))
(method for fabrication of **cathode** active material and nonaq. electrolyte **battery**)

RN 407606-49-9 HCAPLUS

CN Iron lithium magnesium phosphate (Fe0.2-1Li0.05-1.2Mg0-0.8(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Mg	0 - 0.8	7439-95-4
Li	0.05 - 1.2	7439-93-2
Fe	0.2 - 1	7439-89-6

IC ICM H01M004-58
ICS H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **cathode** active material nonaq electrolyte **battery**

IT Ball milling
Battery cathodes
Composites
Secondary **batteries**
(method for fabrication of **cathode** active material and nonaq. electrolyte **battery**)

IT Carbon black, uses
(method for fabrication of **cathode** active material and nonaq. electrolyte **battery**)

IT 7440-44-0, Carbon, uses 198782-39-7, Iron lithium phosphate (FeLi0-1(PO4)) 407606-22-8, Chromium iron lithium phosphate (Cr0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-24-0, Cobalt iron lithium phosphate (Co0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-26-2, Copper iron lithium phosphate (Cu0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-28-4, Aluminum iron lithium phosphate (Al0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-30-8, Gallium iron lithium phosphate (Ga0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-32-0, Boron iron lithium phosphate (B0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-34-2, Iron lithium manganese phosphate (Fe0.2-1Li0.05-1.2Mn0-0.8(PO4)) 407606-36-4, Iron lithium nickel phosphate (Fe0.2-1Li0.05-1.2Ni0-0.8(PO4)) 407606-39-7, Iron lithium vanadium phosphate (Fe0.2-1Li0.05-1.2V0-0.8(PO4)) 407606-42-2, Iron lithium molybdenum phosphate (Fe0.2-1Li0.05-1.2Mo0-0.8(PO4)) 407606-44-4, Iron lithium titanium phosphate (Fe0.2-1Li0.05-1.2Ti0-0.8(PO4)) 407606-47-7, Iron lithium zinc phosphate (Fe0.2-1Li0.05-1.2Zn0-0.8(PO4)) **407606-49-9**, Iron lithium magnesium phosphate (Fe0.2-1Li0.05-1.2Mg0-0.8(PO4)) 407606-51-3, Iron lithium niobium phosphate (Fe0.2-1Li0.05-1.2Nb0-0.8(PO4)) 407629-87-2

407629-90-7 407629-95-2 407630-01-7 407630-10-8 407630-14-2
(method for fabrication of **cathode** active material and nonaq. electrolyte **battery**)

IT 15365-14-7P, Iron lithium phosphate FeLiPO4
(method for fabrication of **cathode** active material and nonaq. electrolyte **battery**)

IT 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer
(method for fabrication of **cathode** active material and nonaq. electrolyte **battery**)

L31 ANSWER 3 OF 9 HCAPLUS COPYRIGHT 2003 ACS

2002:272908 Document No. 136:297394 Solid **electrolyte cell**. Goto, Shuji; Hosoya, Mamoru; Endo, Takahiro (Sony Corporation, Japan). Eur. Pat. Appl. EP 1195826 A2 20020410, 16 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN: EPXXDW. APPLICATION: EP 2001-123774 20011004. PRIORITY: JP 2000-306876 20001005.

AB A solid **electrolyte cell** in which cell characteristics are not deteriorated even on overdischarge to the cell voltage of 0 V, such that the shape of the cell encapsulated in the laminate film is maintained. The cell includes a **cathode** contg. a compd. represented by the general formula LixFe1-yMyPO4 where 0.05 .ltoreq. x .ltoreq. 1.2, 0 .ltoreq. y .ltoreq. 0.8, and M is at least one selected from the group consisting of Mn, Cr, Co, Cu, Ni, V, Mo, Ti, Zn, Al, Ga, Mg, B and Nb, an **anode** and a solid electrolyte. An **electrode** unit 1 comprised of the **cathode** and the **anode** layered together with interposition of the solid electrolyte is encapsulated with a laminate film 2.

IT **407606-49-9**, Iron lithium magnesium phosphate (Fe0.2-1Li0.05-1.2Mg0-0.8(PO4))
(solid **electrolyte cell**)

RN 407606-49-9 HCAPLUS

CN Iron lithium magnesium phosphate (Fe0.2-1Li0.05-1.2Mg0-0.8(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Mg	0 - 0.8	7439-95-4
Li	0.05 - 1.2	7439-93-2
Fe	0.2 - 1	7439-89-6

IC ICM H01M004-58
ICS H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **battery** solid electrolyte

IT Polyoxyalkylenes, uses
(lithium complex; solid **electrolyte cell**)

IT **Battery cathodes**

Secondary **batteries**
(solid **electrolyte cell**)

IT Fluoropolymers, uses
(solid **electrolyte cell**)

IT 7439-93-2D, Lithium, polyethylene oxide complex 7791-03-9, Lithium perchlorate 12031-65-1, Lithium nickel oxide linio2 12057-17-9, Lithium manganese oxide limn2o4 15365-14-7, Iron lithium phosphate felipo4 25322-68-3D, Polyethylene oxide, lithium complex 116327-69-6, Cobalt lithium nickel oxide Co0.1LiNi0.9O2 147812-18-8, Iron lithium manganese oxide Fe0.05LiMn1.95O4 407606-22-8, Chromium iron lithium phosphate (Cr0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-24-0, Cobalt iron lithium phosphate (Co0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-26-2, Copper iron lithium phosphate (Cu0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-28-4, Aluminum iron lithium phosphate (Al0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-30-8, Gallium iron lithium phosphate (Ga0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-32-0, Boron iron lithium phosphate (B0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-34-2, Iron lithium manganese phosphate (Fe0.2-1Li0.05-1.2Mn0-0.8(PO4)) 407606-36-4, Iron lithium nickel phosphate (Fe0.2-1Li0.05-1.2Ni0-0.8(PO4)) 407606-39-7, Iron lithium vanadium phosphate (Fe0.2-1Li0.05-1.2V0-0.8(PO4)) 407606-42-2, Iron lithium molybdenum phosphate (Fe0.2-1Li0.05-1.2Mo0-0.8(PO4)) 407606-44-4, Iron lithium titanium phosphate (Fe0.2-1Li0.05-1.2Ti0-0.8(PO4)) 407606-47-7, Iron lithium zinc phosphate (Fe0.2-1Li0.05-1.2Zn0-0.8(PO4)) **407606-49-9**, Iron lithium magnesium phosphate (Fe0.2-1Li0.05-1.2Mg0-0.8(PO4)) 407606-51-3, Iron lithium niobium phosphate (Fe0.2-1Li0.05-1.2Nb0-0.8(PO4)) 408331-94-2, Cobalt lithium nickel oxide ((Co,Ni)Li0-2O2) 408331-95-3, Cobalt lithium manganese oxide ((Co,Mn)Li0-2O2) 408331-96-4, Cobalt lithium zinc oxide ((Co,Zn)Li0-2O2) 408331-97-5, Cobalt lithium tin oxide ((Co,Sn)Li0-2O2) 408331-99-7, Cobalt lithium vanadium oxide ((Co,V)Li0-2O2) 408332-00-3, Cobalt lithium titanium oxide ((Co,Ti)Li0-2O2) 408332-01-4, Cobalt lithium molybdenum oxide ((Co,Mo)Li0-2O2) 408332-02-5, Cobalt lithium tungsten oxide ((Co,W)Li0-2O2) 408332-03-6, Cobalt lithium magnesium oxide ((Co,Mg)Li0-2O2) 408332-04-7, Cobalt lithium strontium oxide ((Co,Sr)Li0-2O2) 408332-05-8, Cobalt lithium niobium oxide ((Co,Nb)Li0-2O2) 408332-06-9, Cobalt iron lithium oxide ((Co,Fe)Li0-2O2) 408332-07-0, Cobalt copper lithium oxide ((Co,Cu)Li0-2O2) 408332-08-1, Aluminum cobalt lithium oxide ((Al,Co)Li0-2O2) 408332-09-2, Cobalt lithium borate oxide (Co0-1Li0-2(BO2)0-1O0-2) 408332-10-5, Cobalt gallium lithium oxide ((Co,Ga)Li0-2O2) 408332-11-6, Chromium cobalt lithium oxide ((Cr,Co)Li0-2O2) 408332-12-7, Calcium cobalt lithium oxide ((Ca,Co)Li0-2O2) 408332-13-8, Iron lithium nickel oxide ((Fe,Ni)Li0-2O2) 408332-14-9, Copper lithium nickel oxide ((Cu,Ni)Li0-2O2) 408332-15-0, Aluminum lithium nickel oxide ((Al,Ni)Li0-2O2) 408332-16-1, Lithium nickel borate oxide (Li0-2Ni0-1(BO2)0-1O0-2) 408332-17-2, Gallium lithium nickel oxide ((Ga,Ni)Li0-2O2) 408332-18-3, Chromium lithium nickel oxide ((Cr,Ni)Li0-2O2) 408332-19-4, Calcium lithium nickel oxide

((Ca,Ni)Li0-2O2) 408332-20-7, Lithium manganese nickel oxide
(Li0-2(Mn,Ni)O2) 408332-21-8, Lithium nickel zinc oxide
(Li0-2(Ni,Zn)O2) 408332-22-9, Lithium nickel tin oxide
(Li0-2(Ni,Sn)O2) 408332-23-0, Lithium nickel vanadium oxide
(Li0-2(Ni,V)O2) 408332-24-1, Lithium nickel titanium oxide
(Li0-2(Ni,Ti)O2) 408332-25-2, Lithium nickel tungsten oxide
(Li0-2(Ni,W)O2) 408332-26-3, Lithium molybdenum nickel oxide
(Li0-2(Mo,Ni)O2) 408332-27-4, Lithium magnesium nickel oxide
(Li0-2(Mg,Ni)O2) 408332-28-5, Lithium nickel strontium oxide
(Li0-2(Ni,Sr)O2) 408332-29-6, Lithium nickel niobium oxide
(Li0-2(Ni,Nb)O2) 408332-30-9, Lithium manganese nickel oxide
(Li0-2(Mn,Ni)2O4) 408332-31-0, Lithium manganese zinc oxide
(Li0-2(Mn,Zn)2O4) 408332-32-1, Lithium manganese tin oxide
(Li0-2(Mn,Sn)2O4) 408332-33-2, Lithium manganese vanadium oxide
(Li0-2(Mn,V)2O4) 408332-34-3, Lithium manganese titanium oxide
(Li0-2(Mn,Ti)2O4) 408332-35-4, Lithium manganese molybdenum oxide
(Li0-2(Mn,Mo)2O4) 408332-36-5, Lithium manganese tungsten oxide
(Li0-2(Mn,W)2O4) 408332-37-6, Lithium magnesium manganese oxide
(Li0-2(Mg,Mn)2O4) 408332-38-7, Lithium manganese strontium oxide
(Li0-2(Mn,Sr)2O4) 408332-39-8, Lithium manganese niobium oxide
(Li0-2(Mn,Nb)2O4) 408332-40-1, Iron lithium manganese oxide
((Fe,Mn)2Li0-2O4) 408332-42-3, Cobalt lithium manganese oxide
((Co,Mn)2Li0-2O4) 408332-44-5, Aluminum lithium manganese oxide
((Al,Mn)2Li0-2O4) 408332-45-6, Lithium manganese borate oxide
(Li0-2Mn0-2(BO2)0-2O0-4) 408332-46-7, Gallium lithium manganese oxide ((Ga,Mn)2Li0-2O4) 408332-47-8, Chromium lithium manganese oxide ((Cr,Mn)2Li0-2O4) 408332-48-9, Calcium lithium manganese oxide ((Ca,Mn)2Li0-2O4) 408332-58-1, Aluminum cobalt lithium nickel oxide (Al0.01Co0.98LiNi0.01O2) 412351-36-1, Iron lithium manganese phosphate (Fe0.9LiMn0.1(PO4))
(solid **electrolyte cell**)

IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate 7782-42-5, Graphite, uses 12190-79-3, Cobalt lithium oxide colio2 21324-40-3, Lithium hexafluorophosphate 24937-79-9, Pvdf
(solid **electrolyte cell**)

L31 ANSWER 4 OF 9 HCAPLUS COPYRIGHT 2003 ACS
2002:256645 Document No. 136:297382 Carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as **battery electrodes**.
Armand, Michel; Gauthier, Michel; Magnan, Jean-Francois; Ravet, Nathalie (Hydro-Quebec, Can.). PCT Int. Appl. WO 2002027824 A1 20020404, 78 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (French). CODEN: PIXXD2. APPLICATION: WO 2001-CA1350 20010921. PRIORITY: CA 2000-2320661 20000926.

AB Carbon-coated redox materials suitable for use in **battery electrodes** consist of a core surrounded by a coating, or interconnected by carbon crosslinks, in which the core includes a compn. of formula LixM1-yM'y(XO4)n, in which y = 0-0.6, x = 0-2, n = 0-1.5; M is a transition metal; and M' is a element of fixed valence selected from Mg2+, Ca2+, Al3+, and Zn2+, and X is S, P, and Si. Synthesis of the materials is carried out by reacting a balanced mixt. of appropriate precursors in a reducing atm., to adjust the valence of the transition metals, in the presence of a carbon source, which is then pyrolyzed. The resulting products exhibit an excellent elec. cond. and a highly enhanced chem. activity.

IT **407640-53-3**, Iron lithium magnesium phosphate (Fe0.7-1LiMg0-0.3(PO4)) **407640-54-4**, Calcium iron lithium phosphate (Ca0-0.3Fe0.7-1Li(PO4)) **407640-55-5**
(metal source; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as **battery electrodes**)

RN 407640-53-3 HCAPLUS

CN Iron lithium magnesium phosphate (Fe0.7-1LiMg0-0.3(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Mg	0 - 0.3	7439-95-4
Li	1	7439-93-2
Fe	0.7 - 1	7439-89-6

RN 407640-54-4 HCAPLUS

CN Calcium iron lithium phosphate (Ca0-0.3Fe0.7-1Li(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Ca	0 - 0.3	7440-70-2
Li	1	7439-93-2
Fe	0.7 - 1	7439-89-6

RN 407640-55-5 HCAPLUS

CN Iron lithium magnesium manganese phosphate (Fe0-1LiMg0-0.2Mn0-1(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Mn	0 - 1	7439-96-5
Mg	0 - 0.2	7439-95-4
Li	1	7439-93-2

Fe | 0 - 1 | 7439-89-6

IC ICM H01M004-48
ICS C01B025-37; C01B033-20; H01M004-58; H01M004-62; C01B017-96
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST carbon encapsulated redox material **battery electrode**; **cathode battery** carbon coated redox material
IT Silanes
(alkoxy, silicon source; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as **battery electrodes**)
IT Polyoxyalkylenes, uses
(alkyl ethers, oligomeric, aprotic solvent; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as **battery electrodes**)
IT Fluoropolymers, uses
Polyesters, uses
Polyethers, uses
(binders; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as **battery electrodes**)
IT **Battery cathodes**
Battery electrodes
Redox agents
(carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as **battery electrodes**)
IT Transition metals, uses
(**electrodes** contg.; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as **battery electrodes**)
IT 78-93-3, Methyl ethyl ketone, uses 96-48-0, Butyrolactone 96-49-1, Ethylene carbonate 107-21-1D, Ethylene glycol, alkyl ethers 108-32-7, Propylene carbonate 111-46-6D, Diethylene glycol, alkyl ethers 112-27-6D, Triethylene glycol, alkyl ethers 112-60-7D, Tetraethylene glycol, alkyl ethers 463-79-6D, Carbonic acid, C1-4-alkyl esters
(aprotic solvent; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as **battery electrodes**)
IT 9011-14-7, Poly(methyl methacrylate) 24937-79-9, Poly(vinylidene difluoride) 25014-41-9, Polyacrylonitrile
(binders; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as **battery electrodes**)
IT 50-99-7, Glucose, reactions 57-48-7, Fructose, reactions 57-50-1, Sucrose, reactions 58-86-6, Xylose, reactions 87-79-6, Sorbose 9002-88-4, Polyethylene 9003-07-0, Polypropylene 9004-34-6, Cellulose, reactions 9004-34-6D, Cellulose, esters 9004-35-7, Cellulose acetate 9005-25-8, Starch, reactions 25212-86-6, Poly(furfuryl alcohol) 43094-71-9, Ethylene-ethylene

oxide copolymer
(carbon source; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as **battery electrodes**)

IT 407640-63-5, Iron lithium titanium phosphate sulfate (Fe0.85Li1.35Ti0.15(PO4)0.5(SO4))
(**electrodes** contg.; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as **battery electrodes**)

IT 7439-89-6D, Iron, mixed oxides 7439-96-5D, Manganese, mixed oxides 7440-02-0D, Nickel, mixed oxides 7440-32-6D, Titanium, mixed oxides 7440-47-3D, Chromium, mixed oxides 7440-48-4D, Cobalt, mixed oxides 7440-50-8D, Copper, mixed oxides 7440-62-2D, Vanadium, mixed oxides 13816-45-0, Triphylite 15365-14-7, Iron lithium phosphate (FeLiPO4) 213467-46-0, Iron lithium manganese phosphate (FeLi2Mn(PO4)2)
(**electrodes** contg.; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as **battery electrodes**)

IT 90076-65-6
(electrolyte contg.; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as **battery electrodes**)

IT 516-03-0, Ferrous oxalate
(iron source; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as **battery electrodes**)

IT 7429-90-5, Aluminum, uses 7440-31-5, Tin, uses 7440-36-0, Antimony, uses 7440-66-6, Zinc, uses 7782-42-5, Graphite, uses 39302-37-9, Lithium titanate 207803-50-7, Aluminum cobalt lithium magnesium nickel oxide 258511-24-9, Iron lithium nitride 263898-18-6, Cobalt manganese nitride 407640-62-4
(lithium-based **cathodes** contg.; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as **battery electrodes**)

IT 638-38-0, Manganese(II) acetate
(manganese source; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as **battery electrodes**)

IT 546-89-4, Lithium acetate 553-91-3, Lithium oxalate 554-13-2, Lithium carbonate 1309-37-1, Ferric oxide, reactions 1310-65-2, Lithium hydroxide 1313-13-9, Manganese dioxide, reactions 1314-62-1, Vanadium pentoxide, reactions 1317-61-9, Magnetite, reactions 10045-86-0, Ferric phosphate 10102-24-6, Lithium silicate (Li2SiO3) 10377-48-7, Lithium sulfate 10377-52-3, Lithium phosphate (Li3PO4) 10421-48-4, Ferric nitrate 12057-24-8, Lithium oxide, reactions 12627-14-4 13453-80-0, Lithium dihydrogen phosphate 63985-45-5, Lithium orthosilicate 407640-52-2, Iron lithium manganese phosphate (Fe0.1-1LiMn0-0.9(PO4)) **407640-53-3**, Iron lithium magnesium phosphate (Fe0.7-1LiMg0-0.3(PO4)) **407640-54-4**, Calcium iron lithium phosphate (Ca0-0.3Fe0.7-1Li(PO4)) **407640-55-5**

407640-56-6, Iron lithium phosphate silicate (FeLi1-1.9(PO4)0.1-1(SiO4)0-0.9) 407640-57-7 407640-58-8, Iron lithium manganese phosphate sulfate (Fe0-1Li1-1.2Mn0-0.2[(PO4),(SO4)]) 407640-59-9, Iron lithium manganese phosphate ((Fe,Mn)Li1-1.6(PO4)) 407640-60-2, Iron lithium manganese phosphate sulfate (Fe1-2Li1-2Mn0-1[(PO4),(SO4)]) 407640-61-3, Iron lithium titanium phosphate ((Fe,Ti)Li0.5-2(PO4)1.5)
(metal source; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as **battery electrodes**)

IT 25322-68-3D, Polyethylene glycol, alkyl ethers
(oligomeric, aprotic solvent; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as **battery electrodes**)

IT 7664-38-2, Phosphoric acid, reactions 7664-38-2D, Phosphoric acid, esters 7783-28-0, Ammonium hydrogen phosphate 10124-54-6, Manganese phosphate
(phosphorus source; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as **battery electrodes**)

IT 7631-86-9, Silica, reactions
(silicon source; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as **battery electrodes**)

IT 7664-93-9, Sulfuric acid, reactions 7783-20-2, Ammonium sulfate, reactions
(sulfur source; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as **battery electrodes**)

L31 ANSWER 5 OF 9 HCAPLUS COPYRIGHT 2003 ACS

2002:9172 Document No. 136:225905 Clustering of Fe3+ in the Li1-3xFexMgPO4 (0<x<0.1) solid solution. Goni, Aintzane; Lezama, Luis; Pujana, Ainhoa; Arriortua, Maria Isabel; Rojo, Teofilo (Universidad del Pais Vasco, Departamento Quimica Inorganica, Bilbao, 48080, Spain). International Journal of Inorganic Materials, 3(7), 937-942 (English) 2001. CODEN: IJIMCR. ISSN: 1466-6049. Publisher: Elsevier Science Ltd..

AB The Li1-3xFexMgPO4 (0<x<0.1) solid soln. was prepd. by solid state synthesis. The structure of these phases was detd. by x-ray diffraction on polycryst. samples, being isostructural with LiMgPO4. Fe3+ substitutes part of the Li+ ions in the channels of the LiMgPO4 structure along the [010] direction, creating cation vacancies. The IR bands corresponding to the vibrational modes of the phosphate groups undergo a gradual widening with the amt. of inserted iron as a consequence of the increase of disorder in the structure. The EPR spectra show signals with an effective g' = 4.0. This fact can be attributed to the presence of high spin Fe3+ ions in orthorhombic symmetry. The increase of Fe3+ in the compds. leads to a broadening of the Lorentzian EPR signals indicating the existence of magnetic interactions between the Fe3+ ions. Magnetic susceptibility measurements on the Li1-3xFexMgPO4 (0<x<0.1) solid soln. show

antiferromagnetic behaviors which can be explained considering that the doped Fe3+ ions exhibit a short range magnetic order, forming clusters assocd. with the vacancies in the structure.

IT **210709-38-9P**, Iron lithium magnesium phosphate (Fe0.03Li0.9MgPO4) **210709-40-3P**, Iron lithium magnesium phosphate (Fe0.1Li0.7MgPO4) **402519-34-0P**, Iron lithium magnesium phosphate (Fe0-0.1Li0.7-1Mg(PO4)) **402519-35-1P**, Iron lithium magnesium phosphate (Fe0.07Li0.8Mg(PO4))
(prepn., crystal structure, ESR and magnetic properties)

RN 210709-38-9 HCAPLUS

CN Iron lithium magnesium phosphate (Fe0.03Li0.9Mg(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Mg	1	7439-95-4
Li	0.9	7439-93-2
Fe	0.03	7439-89-6

RN 210709-40-3 HCAPLUS

CN Iron lithium magnesium phosphate (Fe0.1Li0.7Mg(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Mg	1	7439-95-4
Li	0.7	7439-93-2
Fe	0.1	7439-89-6

RN 402519-34-0 HCAPLUS

CN Iron lithium magnesium phosphate (Fe0-0.1Li0.7-1Mg(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Mg	1	7439-95-4
Li	0.7 - 1	7439-93-2
Fe	0 - 0.1	7439-89-6

RN 402519-35-1 HCAPLUS

CN Iron lithium magnesium phosphate (Fe0.07Li0.8Mg(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number

O4P	1	14265-44-2
Mg	1	7439-95-4
Li	0.8	7439-93-2
Fe	0.07	7439-89-6

CC 78-7 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 75, 77
IT **210709-38-9P**, Iron lithium magnesium phosphate (Fe0.03Li0.9MgPO4) **210709-40-3P**, Iron lithium magnesium phosphate (Fe0.1Li0.7MgPO4) **402519-34-0P**, Iron lithium magnesium phosphate (Fe0-0.1Li0.7-1Mg(PO4)) **402519-35-1P**, Iron lithium magnesium phosphate (Fe0.07Li0.8Mg(PO4))
(prepn., crystal structure, ESR and magnetic properties)

L31 ANSWER 6 OF 9 HCAPLUS COPYRIGHT 2003 ACS
2001:796402 Document No. 135:346863 **Cathode** active material for nonaqueous electrolyte **battery**. Li, Guohua; Yamada, Atsuo (Sony Corporation, Japan). Eur. Pat. Appl. EP 1150367 A2 20011031, 47 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO. (English). CODEN: EPXXDW. APPLICATION: EP 2001-109945 20010424. PRIORITY: JP 2000-128999 20000425; JP 2000-129000 20000425.
AB A pos. **electrode** active material and a nonaq. **electrolyte cell** which uses the pos. **electrode** active material are disclosed. The cell has a high discharge voltage without lowering the capacity and superior charging/discharging characteristics. To this end, the pos. **electrode** active material contains a compd. represented by the general formula LixMnyFe1-yPO4, wherein 0 < .times. .ltoreq. 2 and 0.5 < y < 0.95, or a compd. represented by the general formula LixMnyA1-yPO4, where 0 < x .ltoreq. 2 and 0 < y < 1 and wherein A is a metal element selected from among Ti, Zn, Mg and Co or plural metal elements selected from among Ti, Fe, Zn, Mg and Co.
IT **371145-99-2P**
(**cathode** active material for nonaq. electrolyte **battery**)
RN 371145-99-2 HCAPLUS
CN Iron lithium magnesium manganese phosphate (Fe0.25LiMg0.05Mn0.7(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Mn	0.7	7439-96-5
Mg	0.05	7439-95-4
Li	1	7439-93-2
Fe	0.25	7439-89-6

IC ICM H01M004-50
ICS H01M004-58
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **cathode** active material nonaq electrolyte **battery**

IT **Battery cathodes**
(**cathode** active material for nonaq. electrolyte **battery**)

IT Carbon black, uses
(**cathode** active material for nonaq. electrolyte **battery**)

IT Fluoropolymers, uses
(**cathode** active material for nonaq. electrolyte **battery**)

IT Secondary **batteries**
(lithium; **cathode** active material for nonaq. electrolyte **battery**)

IT 108-32-7, Propylene carbonate 616-38-6, Dimethylcarbonate 7429-90-5, Aluminum, uses 21324-40-3, Lithium hexafluorophosphate 371145-93-6, Iron lithium manganese phosphate (Fe0.05-0.5Li0-2Mn0.5-0.95(PO4))
(**cathode** active material for nonaq. electrolyte **battery**)

IT 207462-44-0P 300858-61-1P 371145-94-7P 371145-95-8P 371145-97-0P **371145-99-2P** 371146-01-9P 371146-06-4P 371146-11-1P
(**cathode** active material for nonaq. electrolyte **battery**)

IT 24937-79-9, Pvdf
(**cathode** active material for nonaq. electrolyte **battery**)

L31 ANSWER 7 OF 9 HCAPLUS COPYRIGHT 2003 ACS

1998:596036 Document No. 129:205207 Secondary lithium **batteries** with lithium and magnesium containing oxide **cathodes**. Igawa, Akiko; Tsuruoka, Shigeo; Yoshikawa, Masanori; Muranaka, Kiyoshi; Komatsu, Yoshimi; Yamauchi, Shuko (Hitachi, Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 10241691 A2 19980911 Heisei, 25 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1997-354358 19971224. PRIORITY: JP 1996-343041 19961224.

AB The **batteries** use **cathodes** composed layer structured LiMO2, where M = Mn, Co, Ni, and/or Fe, and part of Li is replaced by Mg. The **cathode** active mass is preferably LiwMgvNixM1yNzO2, where M1 = Mn, Co, and/or Fe, N = Si, Al, Ca, Cu, P, In, Sn, Mo, Nb, Y, Bi and/or B, 0 .ltoreq.w .ltoreq.1.2, 0.001 .ltoreq.v .ltoreq.0.02, 0.5 .ltoreq.x <0.85, 0.05 .ltoreq.y .ltoreq.0.5, and 0 .ltoreq.z .ltoreq.0.2; LiwMgvCoxM2z'O2, where M2 = Ni, Mn, Fe, Si, Al, Ca, Cu, P, In, Sn, Mo, Nb, YH, Bi and/or B, and 0 .ltoreq.z .ltoreq.0.5; LiwMgvMnxM3z'O2, where M3 = Ni, Co, Fe, Si, Al, Ca, Cu,. P, In, Sn, Mo, Nb, Y, Bi and/or B; or LiwMgvFex M4z'O2, where M4 = Ni, Co, Mn, Si, Al, Ca, Cu, P, In, Sn, Mo, Nb, Y, Bi and/or B.

IT **212076-01-2P 212076-03-4P 212076-49-8P 212076-51-2P 212076-92-1P 212077-31-1P 212077-32-2P 212077-33-3P 212077-34-4P 212077-35-5P 212077-36-6P**

(compns. and properties of magnesium contg. lithium transition metal oxide **cathodes** for secondary lithium **batteries**)

RN 212076-01-2 HCAPLUS
CN Iron lithium magnesium nickel oxide phosphate (Fe0.15Li0-1.2Mg0.01Ni0.8O1.8(PO4)0.05) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	1.8	17778-80-2
O4P	0.05	14265-44-2
Ni	0.8	7440-02-0
Mg	0.01	7439-95-4
Li	0 - 1.2	7439-93-2
Fe	0.15	7439-89-6

RN 212076-03-4 HCAPLUS
CN Cobalt iron lithium magnesium nickel oxide phosphate (Co0.19Fe0.1Li0-1.2Mg0.01Ni0.7O1.96(PO4)0.01) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	1.96	17778-80-2
O4P	0.01	14265-44-2
Co	0.19	7440-48-4
Ni	0.7	7440-02-0
Mg	0.01	7439-95-4
Li	0 - 1.2	7439-93-2
Fe	0.1	7439-89-6

RN 212076-49-8 HCAPLUS
CN Cobalt iron lithium magnesium oxide phosphate (Co0.8Fe0.19Li0-1.2Mg0.02O1.96(PO4)0.01) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	1.96	17778-80-2
O4P	0.01	14265-44-2
Co	0.8	7440-48-4
Mg	0.02	7439-95-4
Li	0 - 1.2	7439-93-2
Fe	0.19	7439-89-6

RN 212076-51-2 HCAPLUS
CN Cobalt iron lithium magnesium nickel oxide phosphate (Co0.75Fe0.05Li0-1.2Mg0.01Ni0.15O1.8(PO4)0.05) (9CI) (CA INDEX NAME)

Component	Ratio	Component

		Registry Number
O	1.8	17778-80-2
O4P	0.05	14265-44-2
Co	0.75	7440-48-4
Ni	0.15	7440-02-0
Mg	0.01	7439-95-4
Li	0 - 1.2	7439-93-2
Fe	0.05	7439-89-6

RN 212076-92-1 HCAPLUS
CN Cobalt iron lithium magnesium manganese oxide phosphate (Co0.15Fe0.05Li0-1.2Mg0.01Mn0.75O1.8(PO4)0.05) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	1.8	17778-80-2
O4P	0.05	14265-44-2
Co	0.15	7440-48-4
Mn	0.75	7439-96-5
Mg	0.01	7439-95-4
Li	0 - 1.2	7439-93-2
Fe	0.05	7439-89-6

RN 212077-31-1 HCAPLUS
CN Cobalt iron lithium magnesium oxide phosphate (Co0.19Fe0.8Li0-1.2Mg0.02O1.96(PO4)0.01) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	1.96	17778-80-2
O4P	0.01	14265-44-2
Co	0.19	7440-48-4
Mg	0.02	7439-95-4
Li	0 - 1.2	7439-93-2
Fe	0.8	7439-89-6

RN 212077-32-2 HCAPLUS
CN Iron lithium magnesium manganese oxide phosphate (Fe0.8Li0-1.2Mg0.02Mn0.1O1.6(PO4)0.1) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	1.6	17778-80-2
O4P	0.1	14265-44-2
Mn	0.1	7439-96-5
Mg	0.02	7439-95-4
Li	0 - 1.2	7439-93-2

Fe	0.8	7439-89-6

RN 212077-33-3 HCAPLUS
CN Cobalt iron lithium magnesium nickel oxide phosphate (Co0.05Fe0.75Li0-1.2Mg0.01Ni0.15O1.8(PO4)0.05) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	1.8	17778-80-2
O4P	0.05	14265-44-2
Co	0.05	7440-48-4
Ni	0.15	7440-02-0
Mg	0.01	7439-95-4
Li	0 - 1.2	7439-93-2
Fe	0.75	7439-89-6

RN 212077-34-4 HCAPLUS
CN Iron lithium magnesium nickel oxide phosphate (Fe0.8Li0-1.2Mg0.01Ni0.19O1.96(PO4)0.01) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	1.96	17778-80-2
O4P	0.01	14265-44-2
Ni	0.19	7440-02-0
Mg	0.01	7439-95-4
Li	0 - 1.2	7439-93-2
Fe	0.8	7439-89-6

RN 212077-35-5 HCAPLUS
CN Iron lithium magnesium manganese borate oxide phosphate (Fe0.8Li0-1.2Mg0.01Mn0.18(BO3)0.01O1.93(PO4)0.01) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	1.93	17778-80-2
O4P	0.01	14265-44-2
BO3	0.01	14213-97-9
Mn	0.18	7439-96-5
Mg	0.01	7439-95-4
Li	0 - 1.2	7439-93-2
Fe	0.8	7439-89-6

RN 212077-36-6 HCAPLUS
CN Iron lithium magnesium manganese nickel borate oxide phosphate (Fe0.8Li0-1.2Mg0.01Mn0.08Ni0.1(BO3)0.01O1.93(PO4)0.01) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	1.93	17778-80-2
O4P	0.01	14265-44-2
BO3	0.01	14213-97-9
Ni	0.1	7440-02-0
Mn	0.08	7439-96-5
Mg	0.01	7439-95-4
Li	0 - 1.2	7439-93-2
Fe	0.8	7439-89-6

IC ICM H01M004-58
ICS H01M004-02; H01M010-40
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST secondary lithium **battery cathode**; lithium magnesium metal oxide **battery cathode**
IT **Battery cathodes**
(compns. and properties of magnesium contg. lithium transition metal oxide **cathodes** for secondary lithium **batteries**)
IT Secondary **batteries**
(lithium; compns. and properties of magnesium contg. lithium transition metal oxide **cathodes** for secondary lithium **batteries**)
IT 212075-82-6P, Cobalt lithium magnesium nickel oxide (Co0.1LiMg0.01Ni0.9O2) 212075-83-7P 212075-84-8P 212075-85-9P 212075-86-0P 212075-87-1P 212075-88-2P 212075-89-3P 212075-90-6P 212075-91-7P 212075-92-8P 212075-93-9P 212075-94-0P 212075-95-1P, Copper iron lithium nickel oxide (Cu0.2Fe0.2Li0-1.2Ni0.6O2) 212075-96-2P, Copper lithium manganese nickel oxide (Cu0.15Li0-1.2Mn0.25Ni0.6O2) 212075-97-3P 212075-98-4P 212075-99-5P 212076-00-1P **212076-01-2P** 212076-02-3P **212076-03-4P** 212076-04-5P 212076-05-6P 212076-06-7P 212076-07-8P 212076-08-9P 212076-09-0P, Iron lithium magnesium nickel tin oxide (Fe0.2Li0-1.2Mg0.02Ni0.7Sn0.1O2) 212076-10-3P 212076-11-4P 212076-12-5P 212076-13-6P 212076-14-7P 212076-15-8P 212076-16-9P 212076-17-0P 212076-18-1P 212076-19-2P 212076-20-5P 212076-21-6P 212076-22-7P 212076-23-8P 212076-24-9P 212076-25-0P, Aluminum cobalt lithium nickel oxide (Al0.1Co0.1Li0-1.2Ni0.8O2) 212076-26-1P, Aluminum cobalt lithium nickel tin oxide (Al0.1Co0.1Li0-1.2Ni0.7Sn0.1O2) 212076-27-2P, Cobalt lithium manganese nickel oxide (Co0.1Li0-1.2Mn0.1Ni0.8O2) 212076-28-3P 212076-29-4P 212076-30-7P 212076-31-8P 212076-32-9P 212076-33-0P 212076-34-1P 212076-35-2P 212076-36-3P 212076-37-4P 212076-38-5P 212076-39-6P 212076-40-9P 212076-41-0P 212076-42-1P 212076-43-2P 212076-44-3P 212076-45-4P 212076-46-5P 212076-47-6P 212076-48-7P **212076-49-8P** 212076-50-1P **212076-51-2P** 212076-52-3P 212076-53-4P 212076-54-5P 212076-55-6P

212076-56-7P 212076-57-8P, Cobalt iron lithium magnesium tin oxide (Co0.7Fe0.2Li0-1.2Mg0.01Sn0.1O2) 212076-58-9P 212076-59-0P
212076-60-3P 212076-61-4P 212076-62-5P 212076-63-6P
212076-64-7P 212076-65-8P 212076-66-9P 212076-67-0P
212076-68-1P 212076-69-2P 212076-70-5P 212076-71-6P
212076-72-7P 212076-73-8P 212076-74-9P 212076-75-0P
212076-76-1P 212076-77-2P 212076-78-3P 212076-79-4P
212076-80-7P 212076-81-8P 212076-82-9P 212076-83-0P
212076-84-1P, Copper iron lithium manganese oxide (Cu0.2Fe0.2Li0-1.2Mn0.6O2) 212076-85-2P 212076-86-3P
212076-87-4P 212076-88-5P 212076-89-6P 212076-90-9P, Iron lithium manganese oxide phosphate (Fe0.19Li0-1.2Mn0.8O1.96(PO4)0.01)
212076-91-0P **212076-92-1P** 212076-93-2P 212076-94-3P
212076-95-4P 212076-96-5P 212076-97-6P 212076-98-7P
212076-99-8P 212077-00-4P 212077-01-5P 212077-02-6P
212077-03-7P 212077-04-8P 212077-05-9P 212077-06-0P
212077-07-1P 212077-08-2P 212077-09-3P 212077-10-6P
212077-11-7P 212077-12-8P 212077-13-9P 212077-14-0P
212077-15-1P 212077-16-2P 212077-17-3P 212077-18-4P
212077-19-5P 212077-20-8P 212077-21-9P 212077-22-0P
212077-23-1P 212077-24-2P 212077-25-3P, Cobalt copper iron lithium oxide (Co0.2Cu0.2Fe0.6Li0-1.2O2) 212077-26-4P, Copper iron lithium manganese oxide (Cu0.2Fe0.6Li0-1.2Mn0.2O2) 212077-27-5P
212077-28-6P 212077-29-7P 212077-30-0P **212077-31-1P**
212077-32-2P 212077-33-3P 212077-34-4P
212077-35-5P 212077-36-6P 212077-37-7P
212077-38-8P 212077-39-9P, Cobalt iron lithium magnesium tin oxide (Co0.2Fe0.7Li0-1.2Mg0.02Sn0.1O2) 212077-40-2P 212077-41-3P
212077-42-4P, Iron lithium magnesium nickel tin oxide (Fe0.7Li0-1.2Mg0.01Ni0.2Sn0.1O2) 212077-43-5P, Cobalt indium iron lithium oxide (Co0.2In0.1Fe0.7Li0-1.2O2) 212077-44-6P
212077-45-7P 212077-46-8P 212077-47-9P 212077-48-0P
212077-49-1P 212077-50-4P 212077-51-5P 212077-52-6P
212077-53-7P
(compns. and properties of magnesium contg. lithium transition metal oxide **cathodes** for secondary lithium **batteries**)

L31 ANSWER 8 OF 9 HCAPLUS COPYRIGHT 2003 ACS
1998:386203 Document No. 129:144051 7Li and 31P nuclear magnetic resonance studies of Li1-3xMgFexPO4. Goni, A.; Bonagamba, T. J.; Silva, M. A.; Panepucci, H.; Rojo, T.; Barberis, G. E. (Facultad de Ciencias, Departamento de Quimica Inorganica, Universidad del Pais Vasco, Bilbao, Spain). Journal of Applied Physics, 84(1), 416-421 (English) 1998. CODEN: JAPIAU. ISSN: 0021-8979. Publisher: American Institute of Physics.
AB The authors report a 7Li and 31P NMR study in the Li1-3xMgFexPO4 phases between 150 and 410 K This study, complementary to those made using Moessbauer and magnetic neutron diffraction expts., confirms that the Fe ions enter as Fe(III) in the lattice, and that they enter substituting Li ions. Ionic cond. measurements, together with the NMR behavior of the 7Li and 31P NMR spectra show that no Li

mobility occurs in the temp. range studied even with the addn. of the Fe impurity.

IT **210709-38-9**, Iron lithium magnesium phosphate (Fe0.03Li0.9Mg(PO4)) **210709-39-0**, Iron lithium magnesium phosphate (Fe0.04Li0.89Mg(PO4)) **210709-40-3**, Iron lithium magnesium phosphate (Fe0.1Li0.7Mg(PO4))
(7Li and 31P NMR studies of Li1-3xMgFexPO4)

RN 210709-38-9 HCAPLUS

CN Iron lithium magnesium phosphate (Fe0.03Li0.9Mg(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Mg	1	7439-95-4
Li	0.9	7439-93-2
Fe	0.03	7439-89-6

RN 210709-39-0 HCAPLUS

CN Iron lithium magnesium phosphate (Fe0.04Li0.89Mg(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Mg	1	7439-95-4
Li	0.89	7439-93-2
Fe	0.04	7439-89-6

RN 210709-40-3 HCAPLUS

CN Iron lithium magnesium phosphate (Fe0.1Li0.7Mg(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Mg	1	7439-95-4
Li	0.7	7439-93-2
Fe	0.1	7439-89-6

CC 77-7 (Magnetic Phenomena)
Section cross-reference(s): 76

IT 7723-14-0, Phosphorus-31, properties 13775-51-4, Lithium magnesium phosphate (LiMgPO4) 13982-05-3, Lithium-7, properties **210709-38-9**, Iron lithium magnesium phosphate (Fe0.03Li0.9Mg(PO4)) **210709-39-0**, Iron lithium magnesium phosphate (Fe0.04Li0.89Mg(PO4)) **210709-40-3**, Iron lithium magnesium phosphate (Fe0.1Li0.7Mg(PO4))
(7Li and 31P NMR studies of Li1-3xMgFexPO4)

L31 ANSWER 9 OF 9 HCAPLUS COPYRIGHT 2003 ACS
1991:85468 Document No. 114:85468 Triphylite-lithiophilite series in China. Ni, Yunxiang; Yang, Yueqing; Guo, Lihou; Zhou, Tianren; Ling, Yueying (Inst. Miner. Deposits, Chin. Acad. Geol. Sci., Peop. Rep. China). Yanshi Kuangwuxue Zazhi, 8(2), 144-55 (Chinese) 1989. CODEN: YKZAEN. ISSN: 1000-6524.

AB Representative samples covering a wide range in compn. over the ideal triphylite-lithiophilite series have been found in China. Chem. compns. of these triphylite-lithiophilite samples show that, in addn. to the major constituents Fe2+ and Mn2+, the cations at the octahedral M(2) site are Mg2+, Ca2+, and Fe3+. The highest MgO content is 7.38 wt.%. In general, Mg2+ readily replaces Fe2+; Ca2+, sometimes, substitutes for Mn2+ at the M(2) site. Pure triphylite has not yet been found; the LiFe[PO4] content of all native triphylites is <80%. Nevertheless, there are very pure lithiophilites in nature. Relations of the chem. compn. (Fe/Mn ratio) to phys. properties, optical properties, and unit-cell dimensions of the series are examd. With increase in the Fe/Mn ratio, the sp. gr. and the n will values increase the cell parameters decrease, and the optic-axis angle varies regularly. Increase in the Mg2+ and Ca2+ contents of the minerals also causes variation in the above properties. The IR spectral anal. of 4 triphylite-lithiophilite samples collected in China was done to det. the correlation between chem. compn. and IR absorption peaks.

IT **132046-14-1**
(compn. of, correlation of, with IR absorption peaks and optical properties and unit-cell parameters, of China)

RN 132046-14-1 HCAPLUS
CN Triphylite, magnesian ((Fe0.5-0.9Mg0.1-0.5)Li(PO4)) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Mg	0.1 - 0.5	7439-95-4
Li	1	7439-93-2
Fe	0.5 - 0.9	7439-89-6

CC 53-1 (Mineralogical and Geological Chemistry)
IT 16455-24-6, Lithiophilite 17548-96-8, Ferroan lithiophilite
116768-44-6 132032-52-1 132032-53-2 132032-54-3
132046-14-1
(compn. of, correlation of, with IR absorption peaks and optical properties and unit-cell parameters, of China)